US006384744B1

(12) **United States Patent**
**Philyaw et al.**

(10) **Patent No.: US 6,384,744 B1**
(45) **Date of Patent: *May 7, 2002**

(54) **METHOD AND SYSTEM FOR DATA TRANSMISSION FROM AN OPTICAL READER**

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(73) Assignee: **Digital:Convergence Corp.**, Dallas, TX (US)

( * ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **09/593,094**

(22) Filed: **Jun. 13, 2000**

**Related U.S. Application Data**

(63) Continuation-in-part of application No. 09/583,134, filed on May 30, 2000, which is a continuation-in-part of application No. 09/382,421, filed on Aug. 24, 1999, and a continuation-in-part of application No. 09/491,136, filed on Jan. 26, 2000, which is a continuation-in-part of application No. 09/378,221, filed on Aug. 19, 1999, which is a continuation-in-part of application No. 09/151,471, filed on Sep. 11, 1998, and a continuation-in-part of application No. 09/151,530, filed on Sep. 11, 1998, now Pat. No. 6,098,106.

(51) **Int. Cl.**[7] ..... **H03M 7/00**
(52) **U.S. Cl.** ..... **341/50**; 709/238
(58) **Field of Search** ..... 341/50, 51, 137; 709/238, 218, 219

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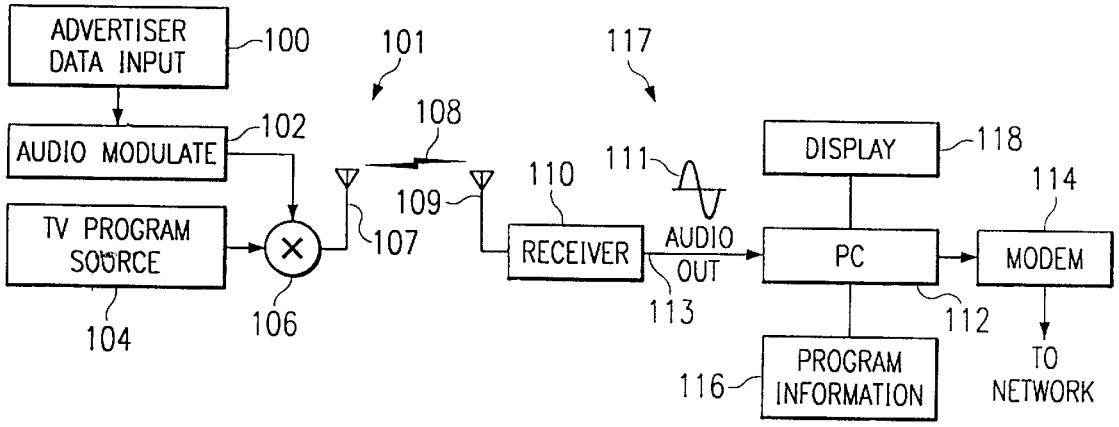
(57) **ABSTRACT**

A method is provided for transmitting data from an optical reader following scanning by the optical reader of an indica encoding information in accordance with one of a plurality of information encoding types. The method includes determining that a particular one of the plurality of encoding types was used for encoding the scanned indicia. A message packet is then transmitted from the optical reader which is indicative of the particular one of the plurality of encoding types that was used for encoding the scanned indicia.

**38 Claims, 25 Drawing Sheets**



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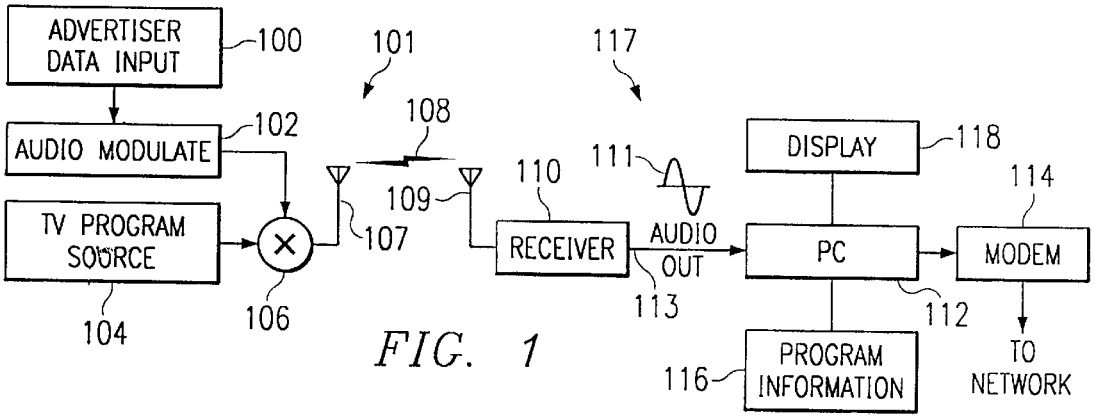



FIG. 1

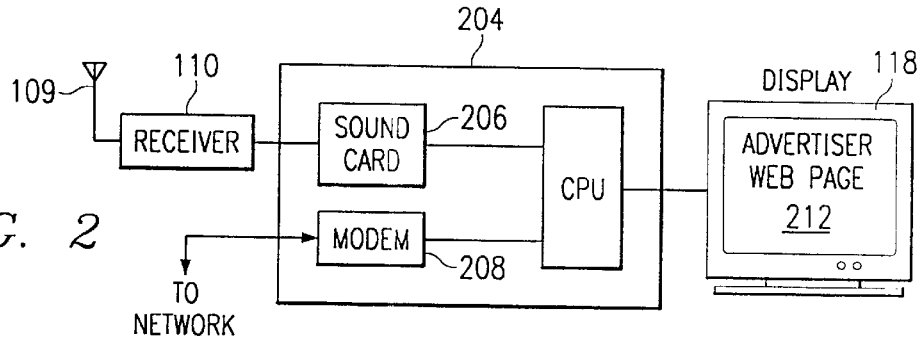



FIG. 2

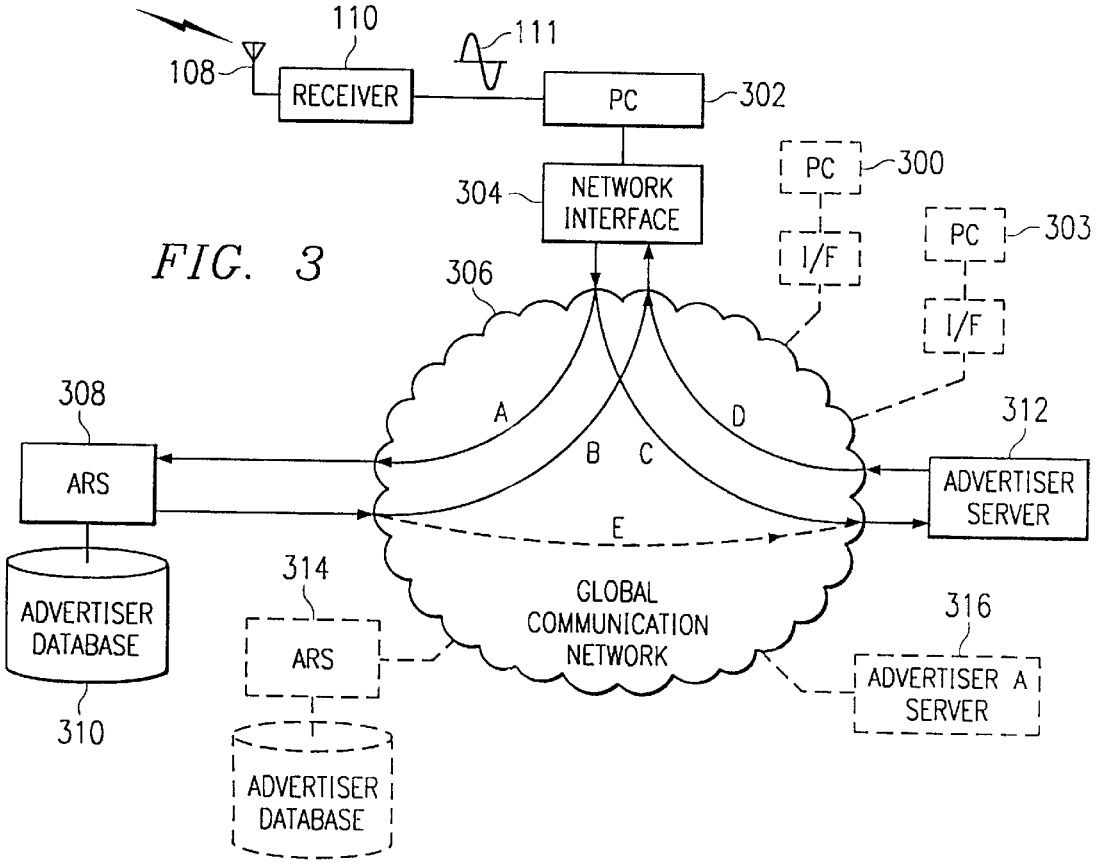



FIG. 3

PATH A: SOURCE TO ARS


FIG. 4a

PATH B: ARS TO SOURCE


FIG. 4b

PATH C: SOURCE TO ADVERTISER


FIG. 4c

PATH D: ADVERTISER TO SOURCE


FIG. 4d

PATH E: ARS TO ADVERTISER (OPTIONAL)

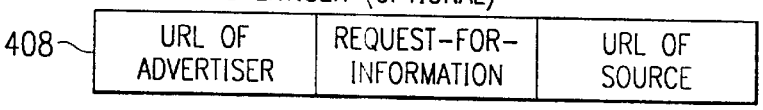



FIG. 4e

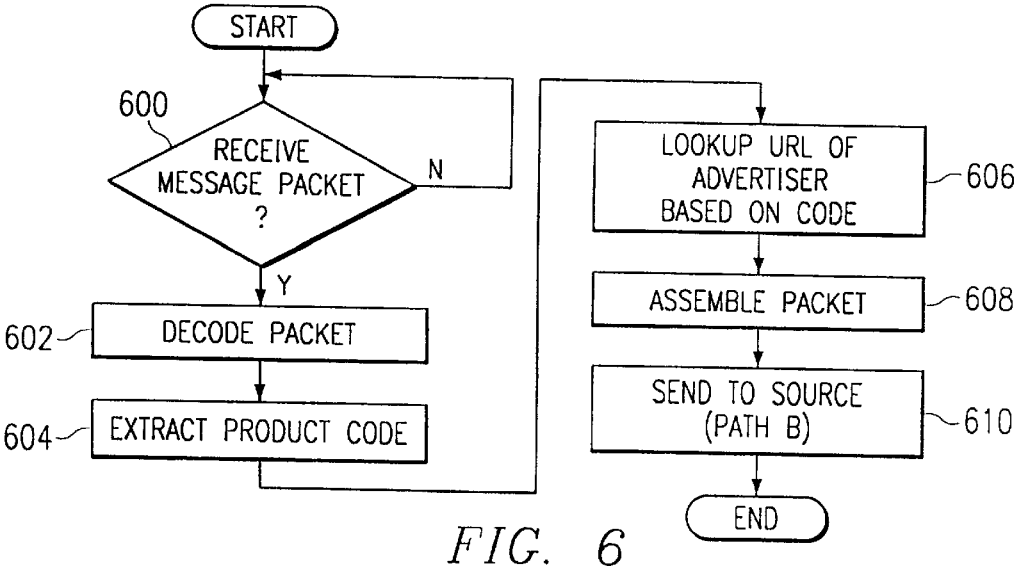



FIG. 6

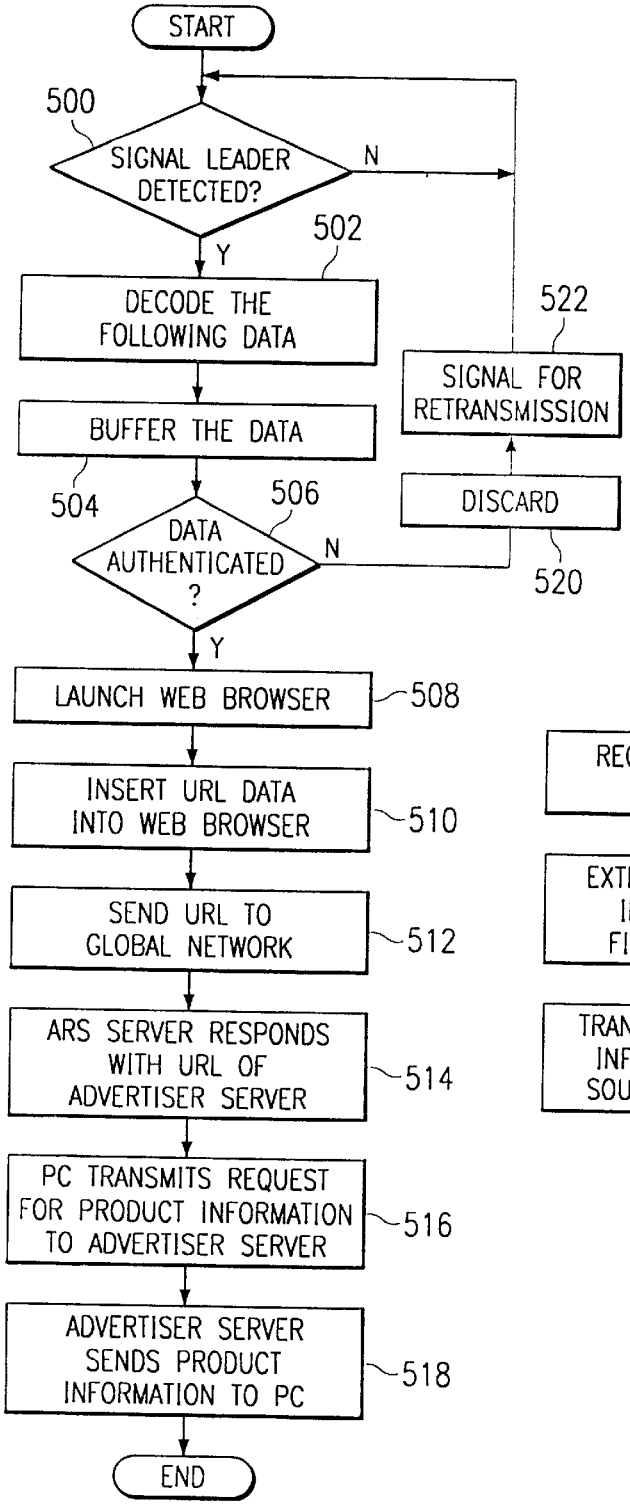

START
500
SIGNAL LEADER DETECTED?
N
Y
502
DECODE THE FOLLOWING DATA
BUFFER THE DATA
504
506
DATA AUTHENTICATED ?
N
Y
522
SIGNAL FOR RETRANSMISSION
DISCARD
520
LAUNCH WEB BROWSER
508
INSERT URL DATA INTO WEB BROWSER
510
SEND URL TO GLOBAL NETWORK
512
ARS SERVER RESPONDS WITH URL OF ADVERTISER SERVER
514
PC TRANSMITS REQUEST FOR PRODUCT INFORMATION TO ADVERTISER SERVER
516
ADVERTISER SERVER SENDS PRODUCT INFORMATION TO PC
518
END

FIG. 5

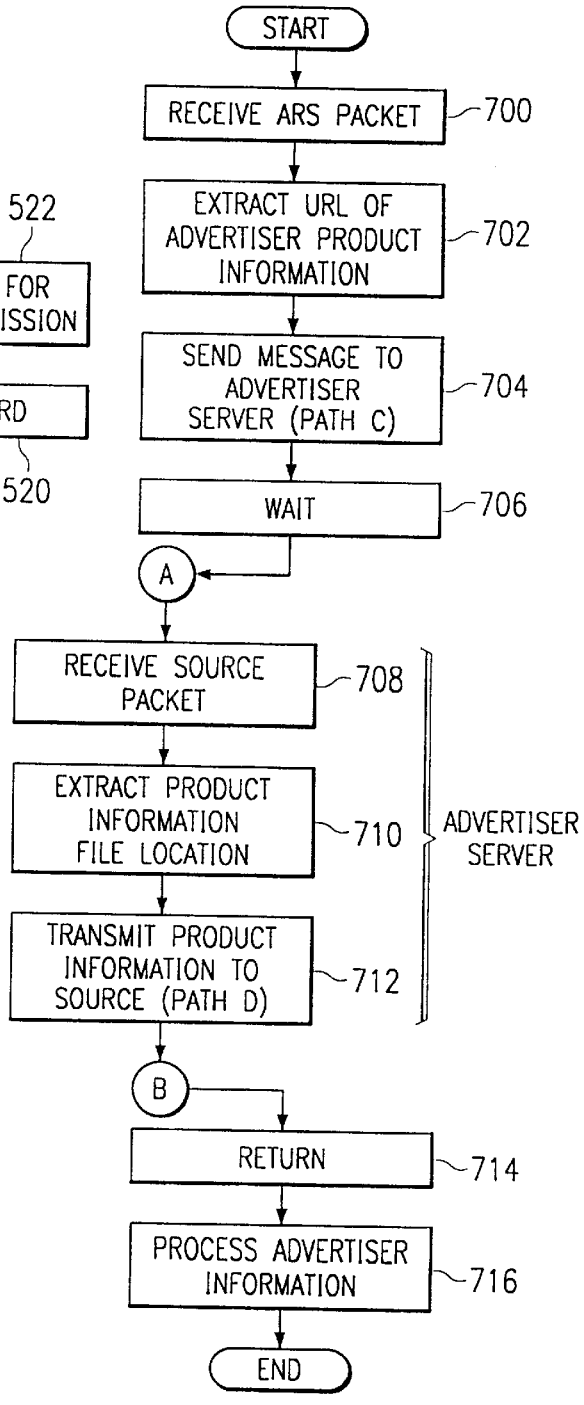

START
RECEIVE ARS PACKET
700
EXTRACT URL OF ADVERTISER PRODUCT INFORMATION
702
SEND MESSAGE TO ADVERTISER SERVER (PATH C)
704
WAIT
706
A
RECEIVE SOURCE PACKET
708
EXTRACT PRODUCT INFORMATION FILE LOCATION
710
TRANSMIT PRODUCT INFORMATION TO SOURCE (PATH D)
712
ADVERTISER SERVER
B
RETURN
714
PROCESS ADVERTISER INFORMATION
716
END

FIG. 7

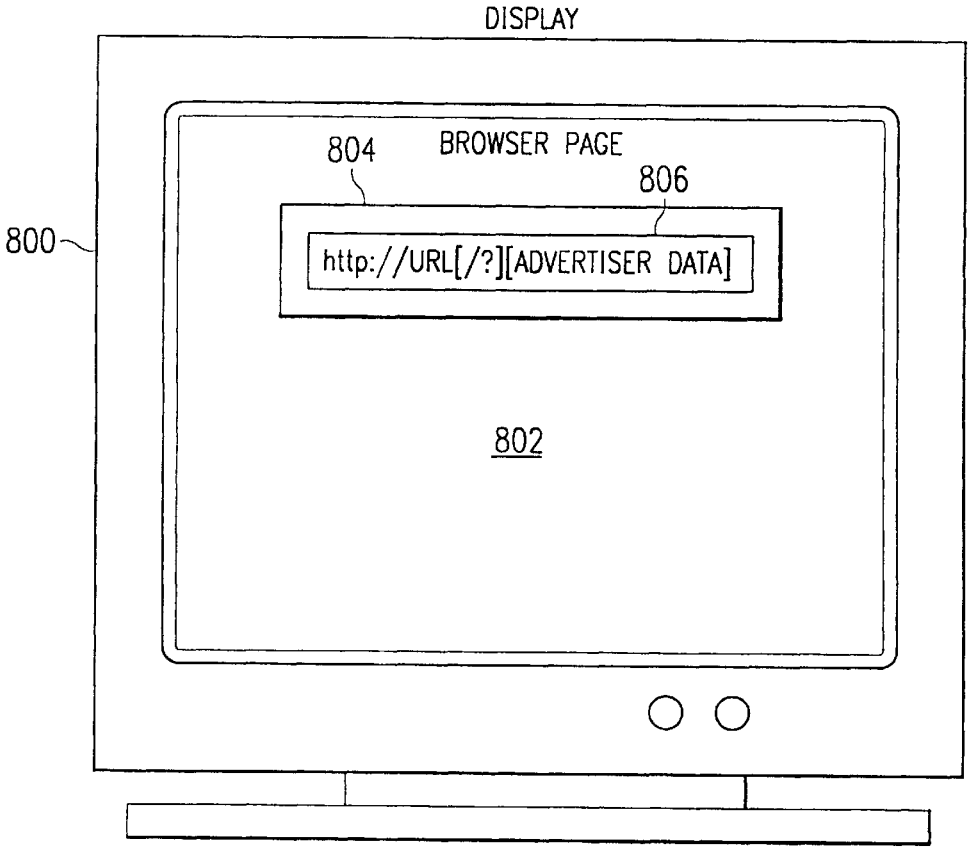

DISPLAY
800
804
BROWSER PAGE
806
http://URL[/?][ADVERTISER DATA]
802
808
URL/ADVERTISER DATA
[Ctrl-0][http://][URL][/?][variable][↵]
OPEN PAGE
USE HYPERTEXT PROTOCOL
URL OF ARS
ALLOW VARIABLE APPENDING
APPENDED VARIABLE (e.g., UPC CODE)
CARRIAGE RETURN - TRANSMIT DATA

FIG. 8

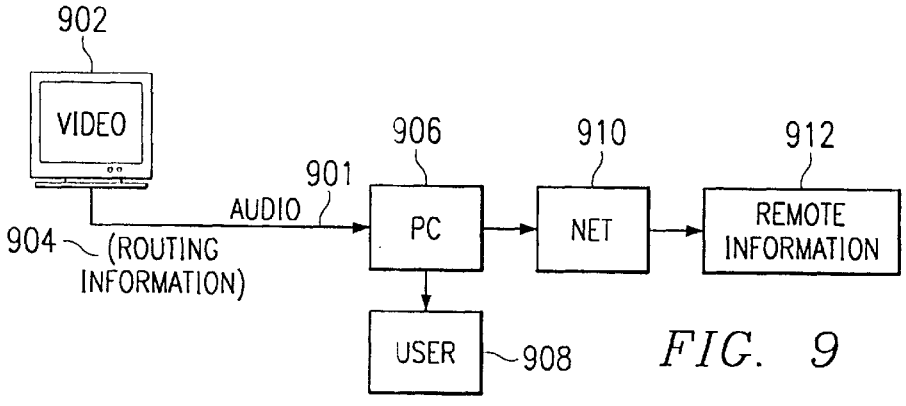

902
VIDEO
906
910
912
901
AUDIO
PC
NET
REMOTE INFORMATION
904
(ROUTING INFORMATION)
USER
908

FIG. 9

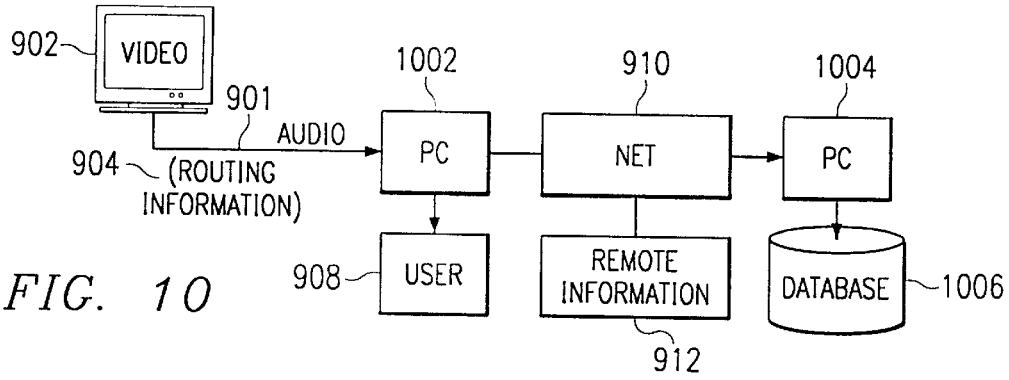



FIG. 10

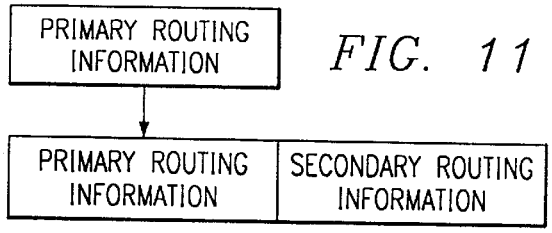



FIG. 11

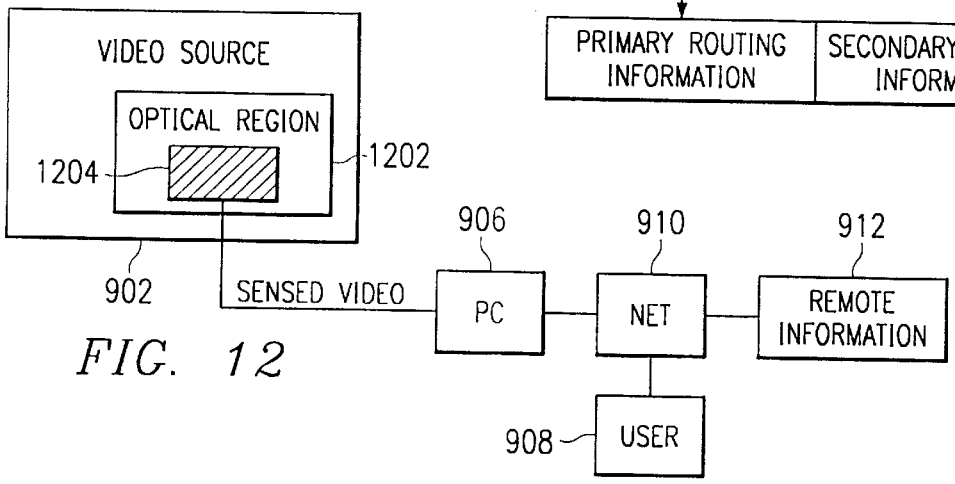



FIG. 12

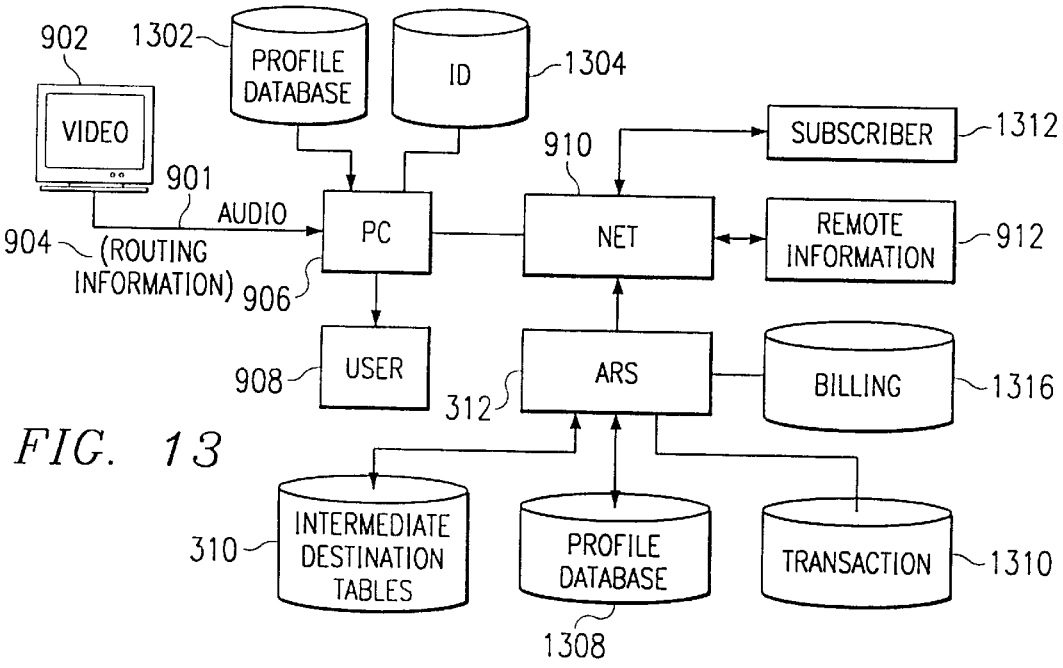



FIG. 13

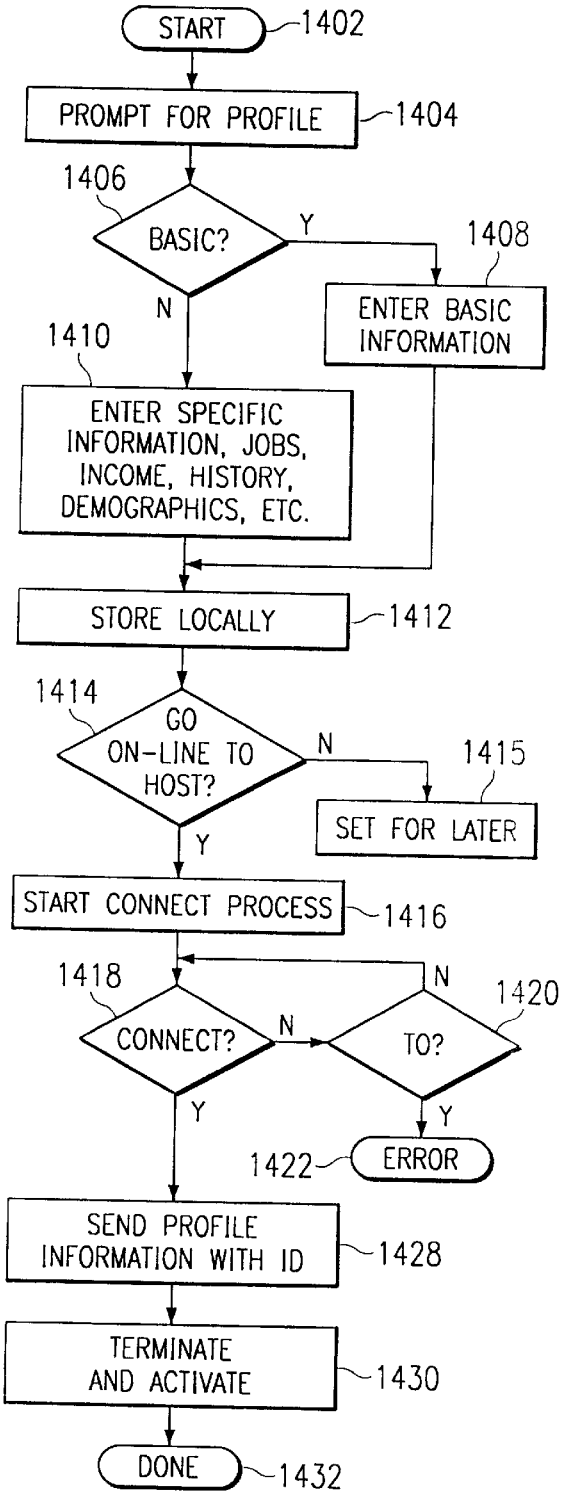

START
1402
PROMPT FOR PROFILE
1404
1406
BASIC?
Y
1408
ENTER BASIC INFORMATION
N
1410
ENTER SPECIFIC INFORMATION, JOBS, INCOME, HISTORY, DEMOGRAPHICS, ETC.
STORE LOCALLY
1412
1414
GO ON-LINE TO HOST?
N
1415
SET FOR LATER
Y
START CONNECT PROCESS
1416
1418
CONNECT?
N
TO?
1420
N
Y
Y
1422
ERROR
SEND PROFILE INFORMATION WITH ID
1428
TERMINATE AND ACTIVATE
1430
DONE
1432

FIG. 14

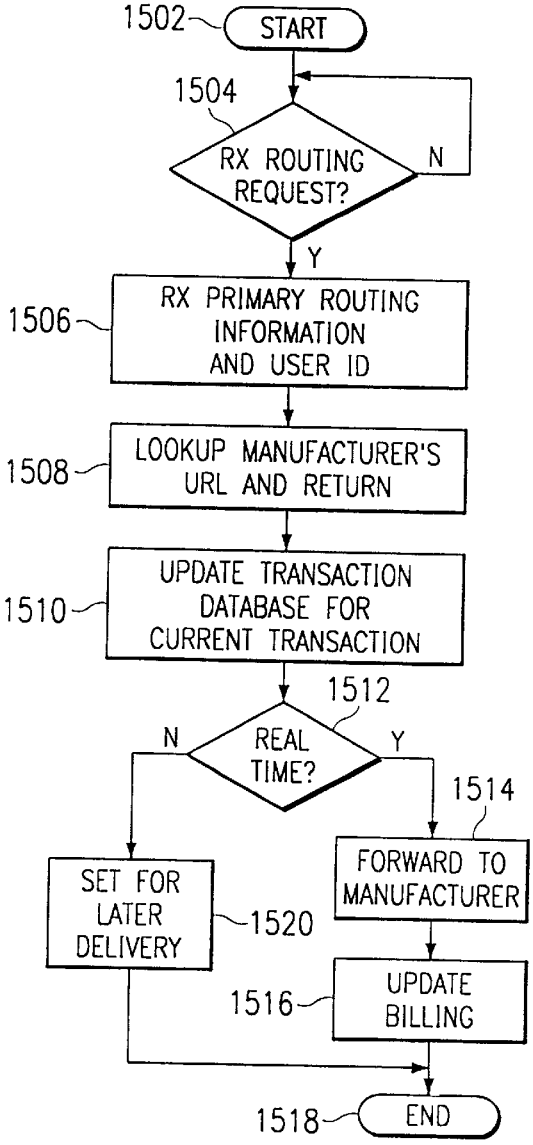

1502
START
1504
RX ROUTING REQUEST?
N
Y
1506
RX PRIMARY ROUTING INFORMATION AND USER ID
1508
LOOKUP MANUFACTURER'S URL AND RETURN
1510
UPDATE TRANSACTION DATABASE FOR CURRENT TRANSACTION
1512
N
REAL TIME?
Y
1514
SET FOR LATER DELIVERY
1520
FORWARD TO MANUFACTURER
1516
UPDATE BILLING
1518
END

FIG. 15

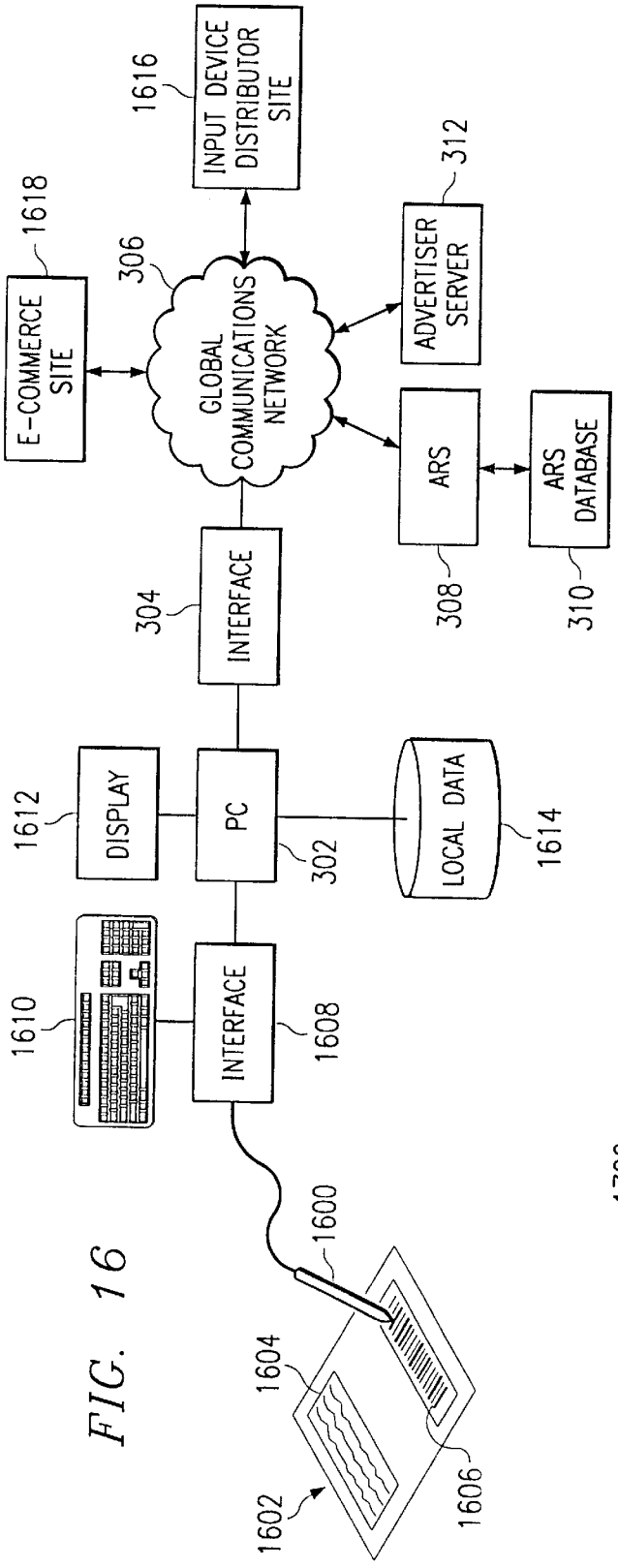



FIG. 16

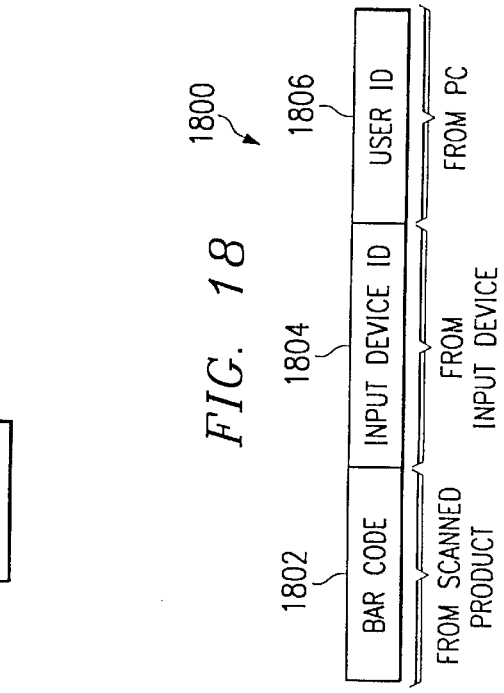



FIG. 18

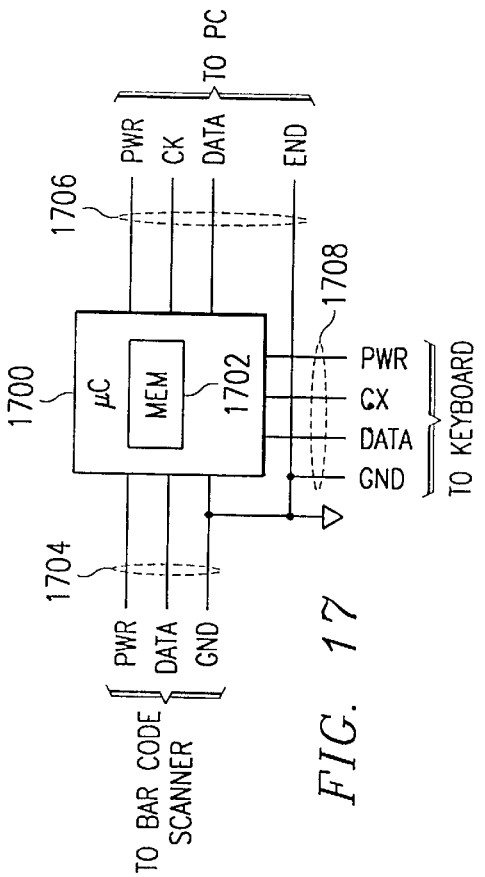



FIG. 17

FIG. 19

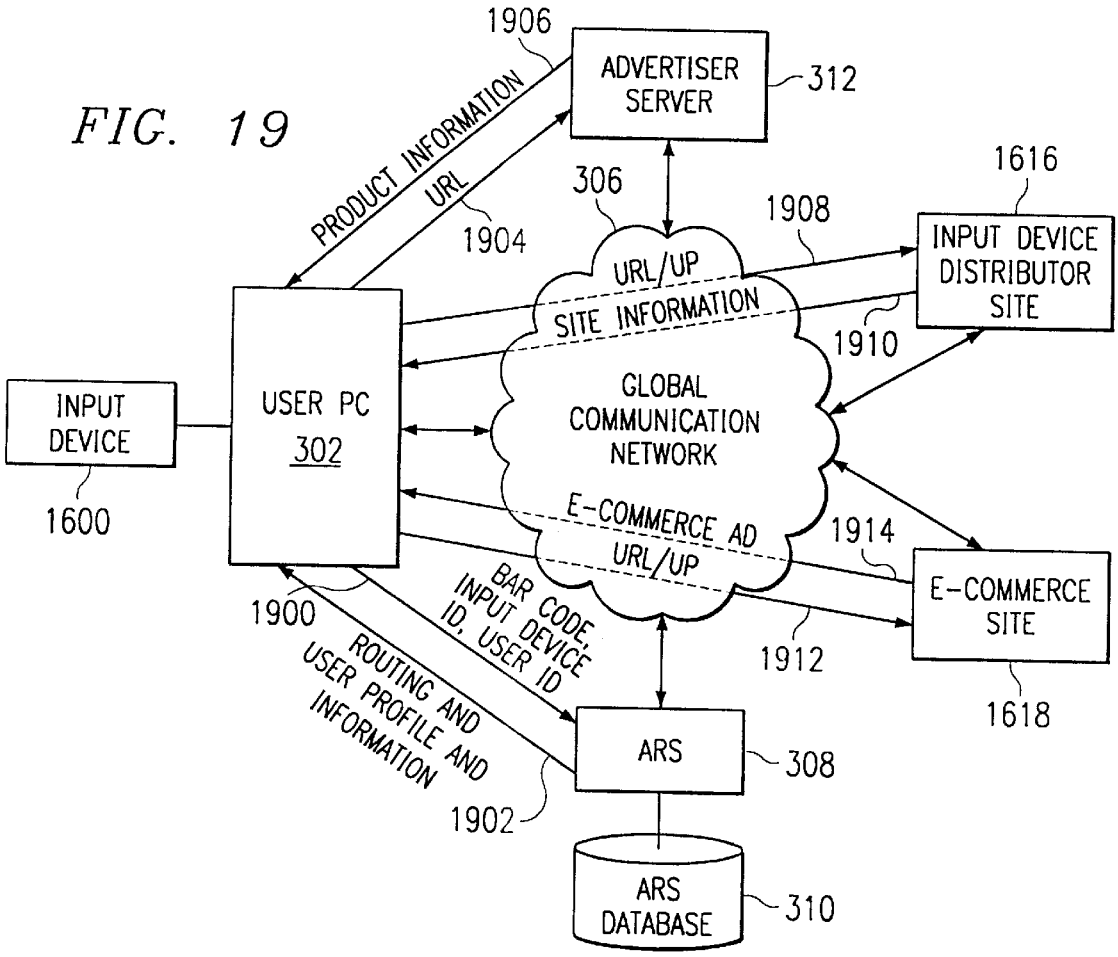

1906
ADVERTISER SERVER
312
PRODUCT INFORMATION
URL
1904
306
1908
1616
INPUT DEVICE DISTRIBUTOR SITE
URL/UP
SITE INFORMATION
1910
INPUT DEVICE
1600
USER PC
302
GLOBAL COMMUNICATION NETWORK
E-COMMERCE AD
URL/UP
1914
E-COMMERCE SITE
1618
1900
BAR CODE, INPUT DEVICE ID, USER ID
ROUTING AND USER PROFILE AND INFORMATION
1912
ARS
308
1902
ARS DATABASE
310

FIG. 20

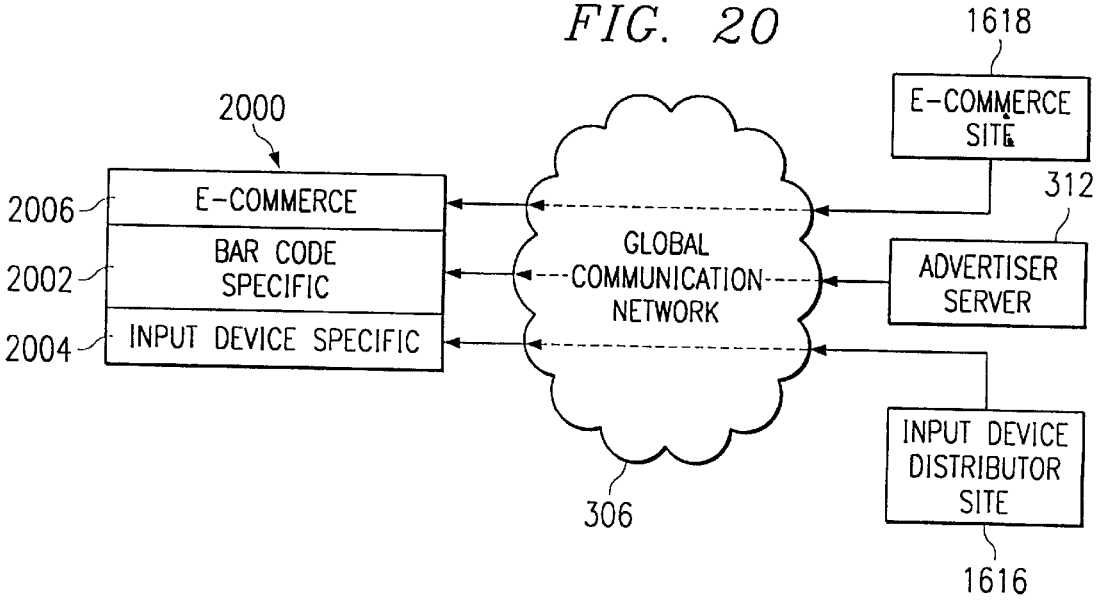

1618
E-COMMERCE SITE
2000
2006
E-COMMERCE
312
2002
BAR CODE SPECIFIC
GLOBAL COMMUNICATION NETWORK
ADVERTISER SERVER
2004
INPUT DEVICE SPECIFIC
INPUT DEVICE DISTRIBUTOR SITE
306
1616

FIG. 21

ARS DATABASE 2100

| 2102 | | 2104 | | 2106 | 2108 | |
|---|---|---|---|---|---|---|
| PRODUCT | | INPUT DEVICE | | USER | E-COMMERCE | |
| BAR CODE | ROUTE | ID | DISTRIBUTOR | PROFILE | BAR CODE | INFORMATION |
| | | | | | | |

FIG. 22

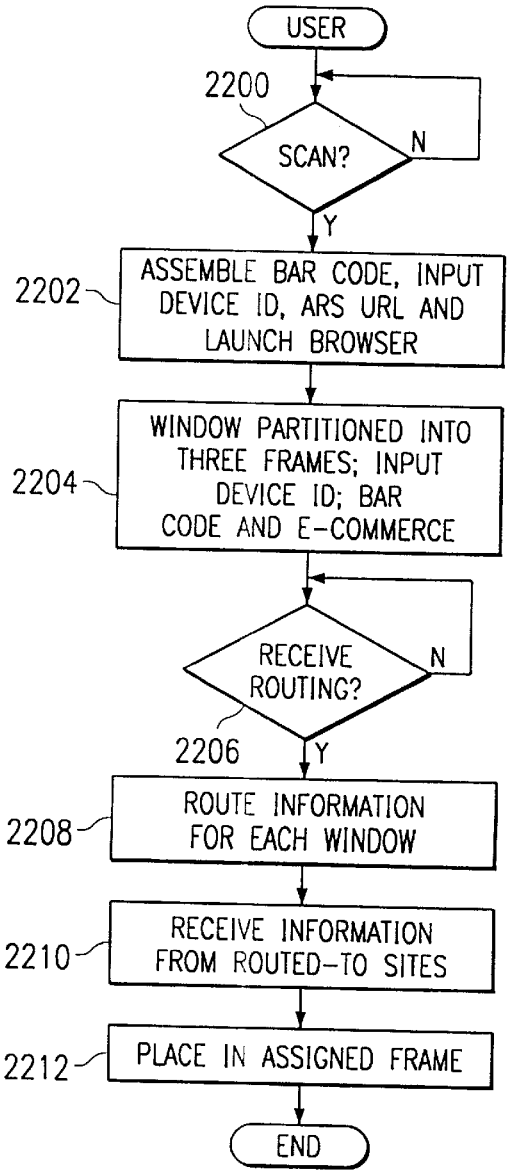


FIG. 23

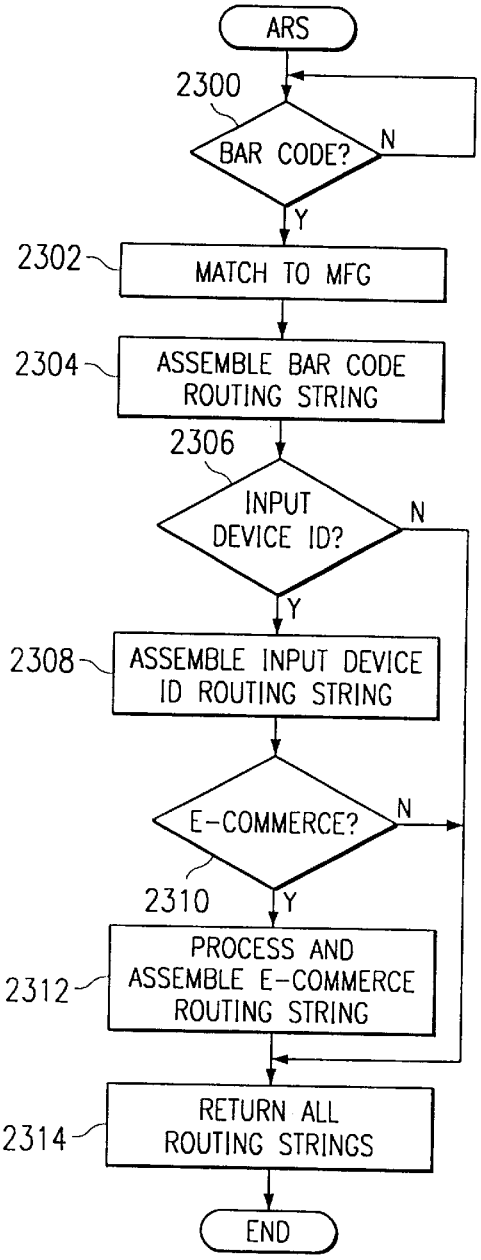
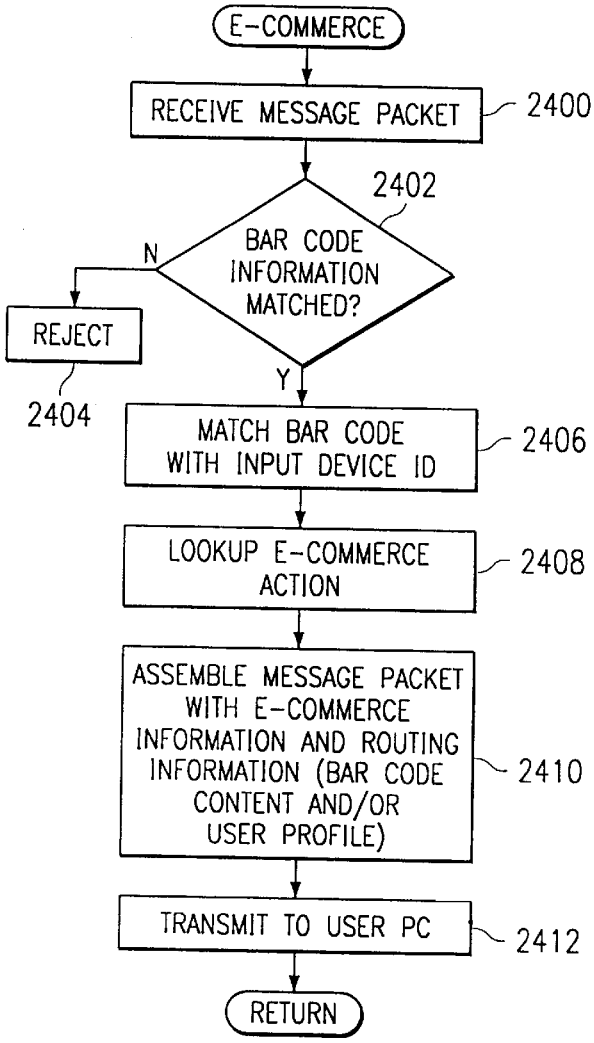

ARS
2300
BAR CODE?
N
Y
2302
MATCH TO MFG
2304
ASSEMBLE BAR CODE ROUTING STRING
2306
INPUT DEVICE ID?
N
Y
2308
ASSEMBLE INPUT DEVICE ID ROUTING STRING
E-COMMERCE?
N
2310
Y
2312
PROCESS AND ASSEMBLE E-COMMERCE ROUTING STRING
2314
RETURN ALL ROUTING STRINGS
END

FIG. 24


E-COMMERCE
RECEIVE MESSAGE PACKET
2400
2402
BAR CODE INFORMATION MATCHED?
N
REJECT
2404
Y
MATCH BAR CODE WITH INPUT DEVICE ID
2406
LOOKUP E-COMMERCE ACTION
2408
ASSEMBLE MESSAGE PACKET WITH E-COMMERCE INFORMATION AND ROUTING INFORMATION (BAR CODE CONTENT AND/OR USER PROFILE)
2410
TRANSMIT TO USER PC
2412
RETURN

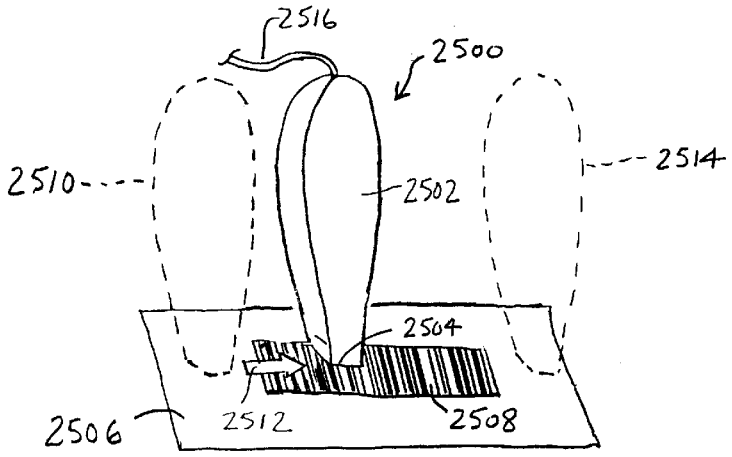



FIG. 25

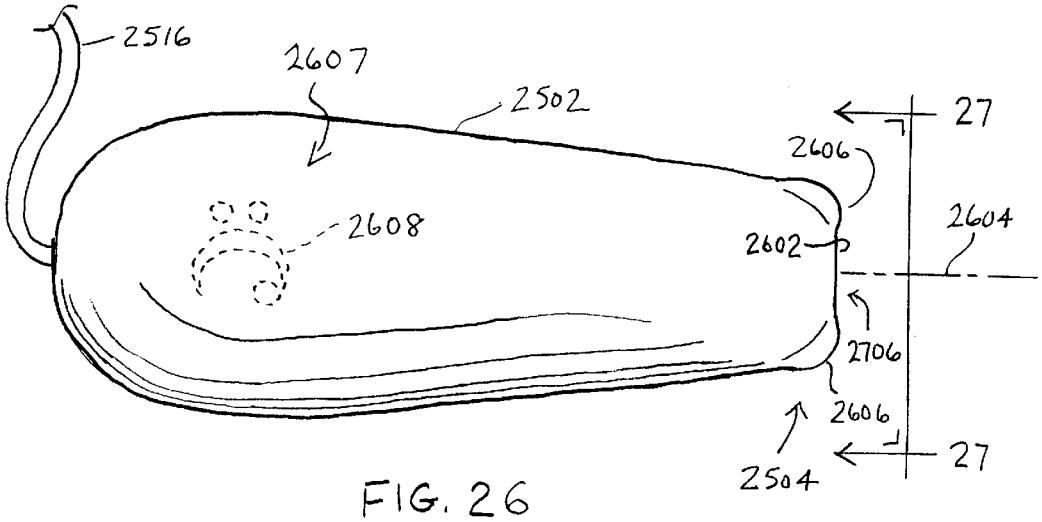



FIG. 26

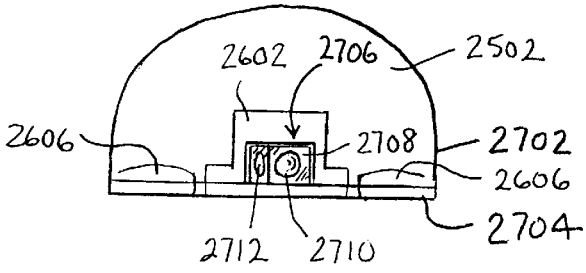



FIG. 27

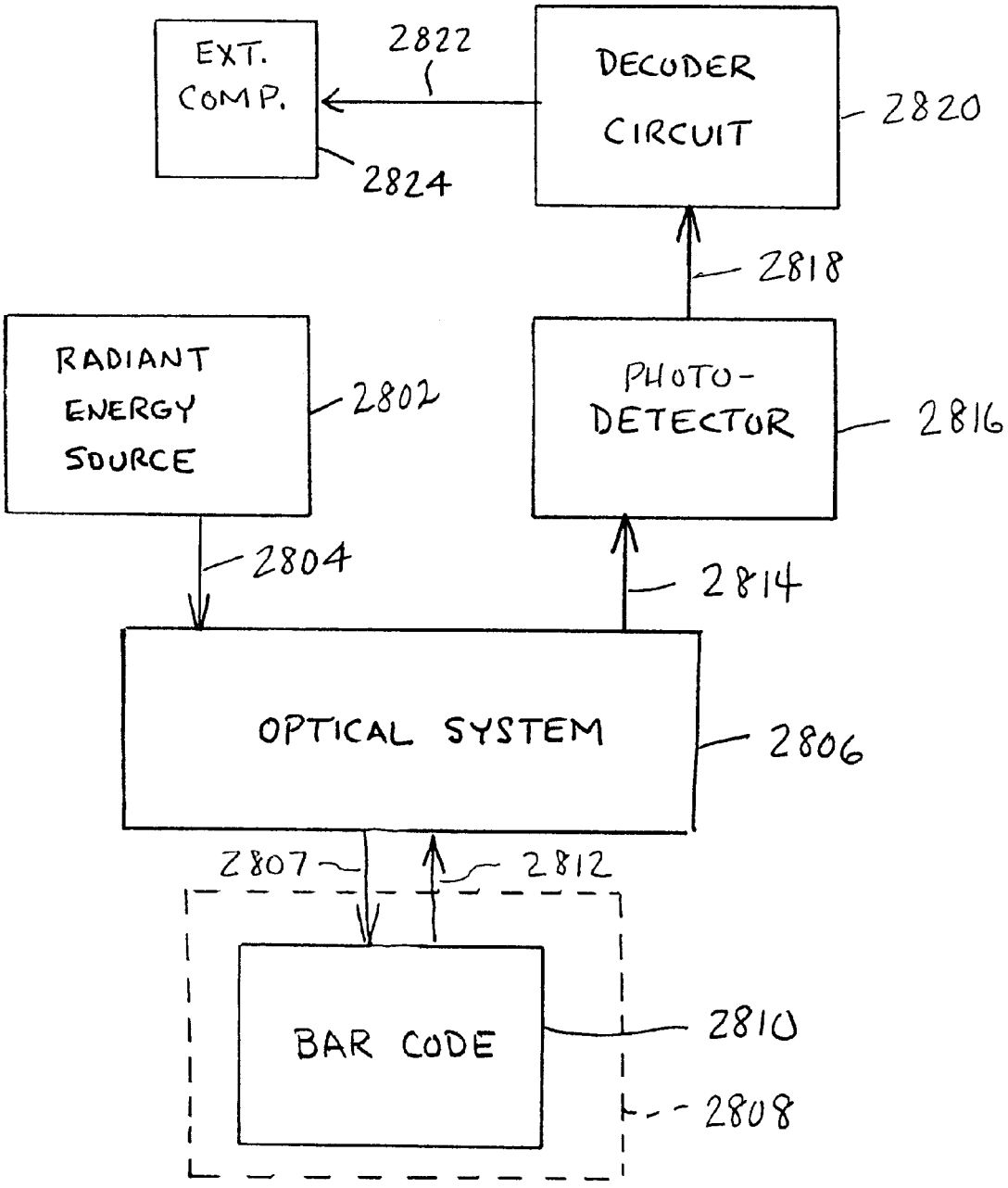

EXT. COMP.
2822
DECODER CIRCUIT
2820
2824
2818
RADIANT ENERGY SOURCE
2802
PHOTO-DETECTOR
2816
2804
2814
OPTICAL SYSTEM
2806
2807
2812
BAR CODE
2810
2808

FIG. 28

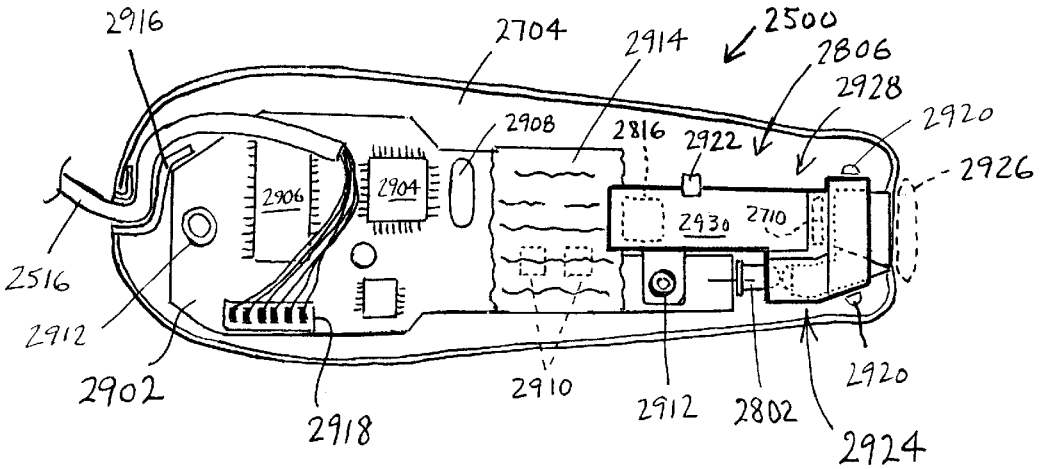

2916
2704
2914
2500
2806
2928
2920
2926
2908
2816
2922
2906
2904
2930
2710
2516
2912
2902
2918
2910
2912
2802
2920
2924

FIG. 29

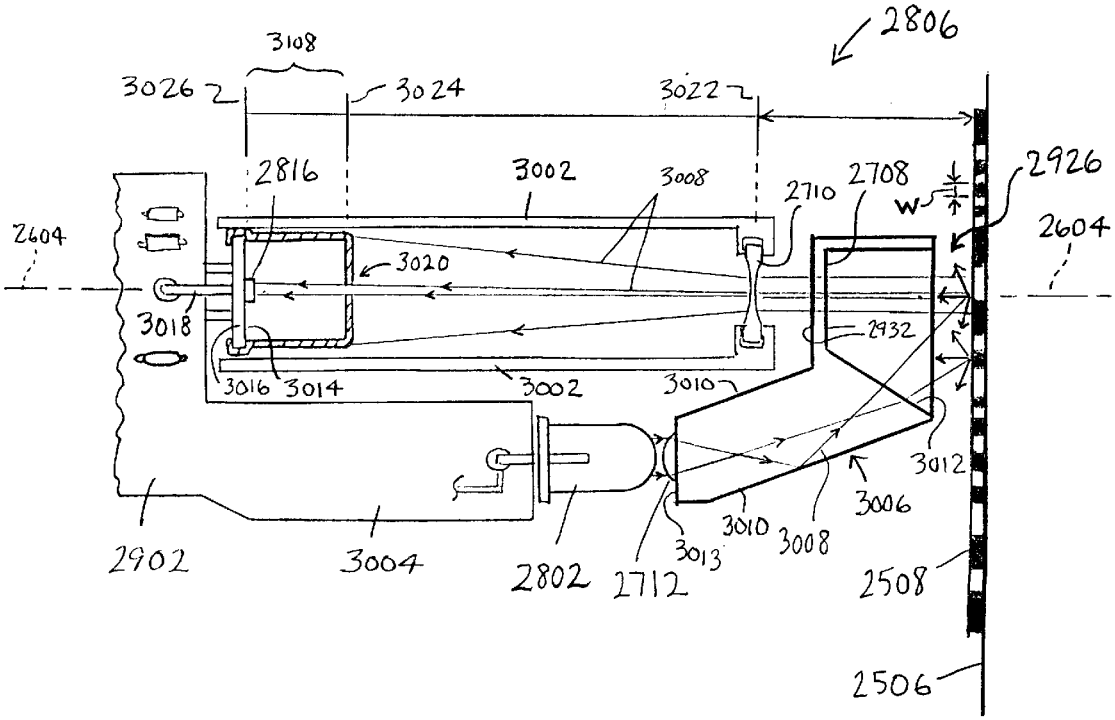

2806
3108
3026
3024
3022
2816
3002
3008
2710
2708
2926
W
2604
2604
3020
3018
2932
3016
3014
3002
3010
3012
3006
3010
3008
2902
3004
2802
2712
3013
2508
2506

FIG. 30

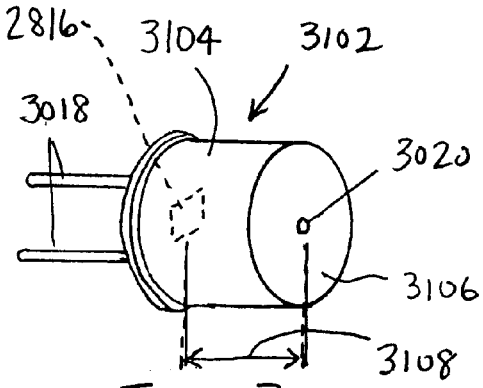

2816
3104
3102
3018
3020
3106
3108

FIG. 31

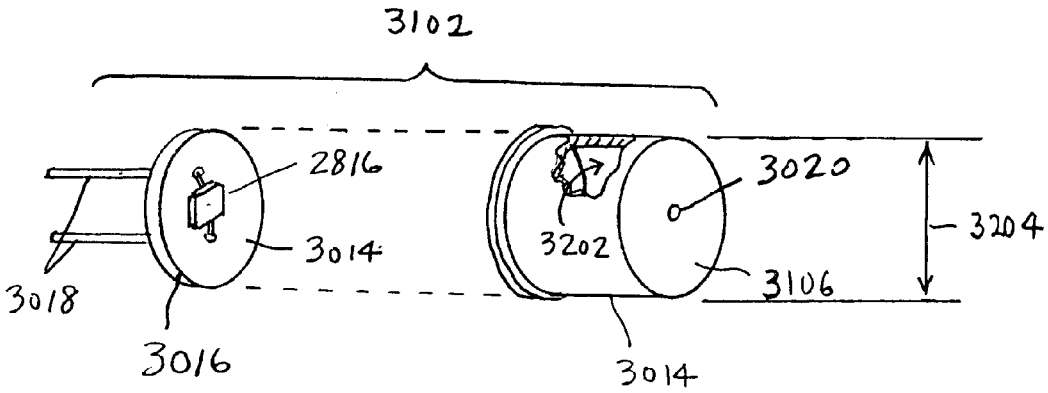

3102
2816
3014
3018
3016
3202
3020
3106
3204
3014

FIG. 32

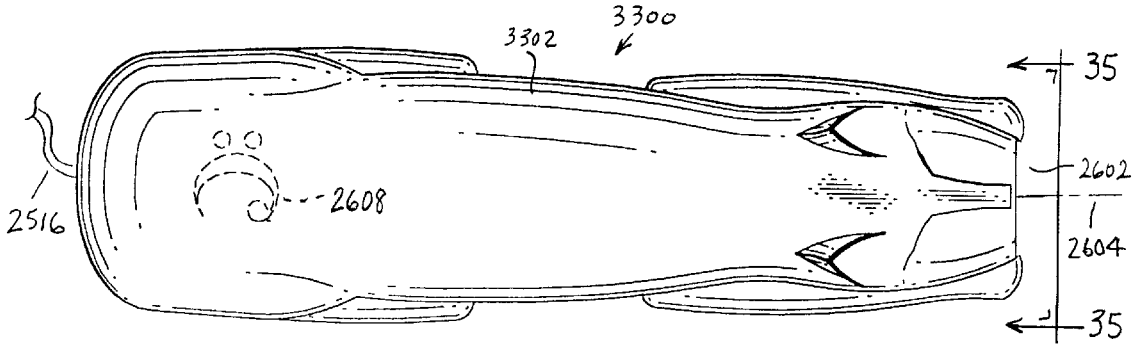



FIG. 33

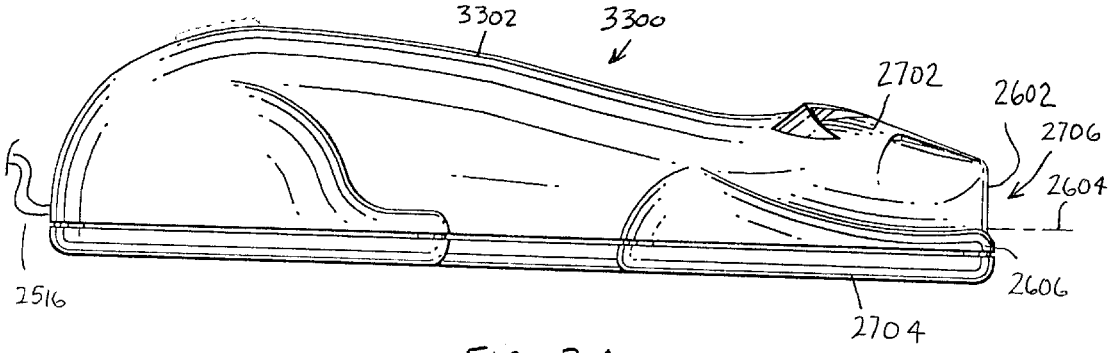



FIG. 34

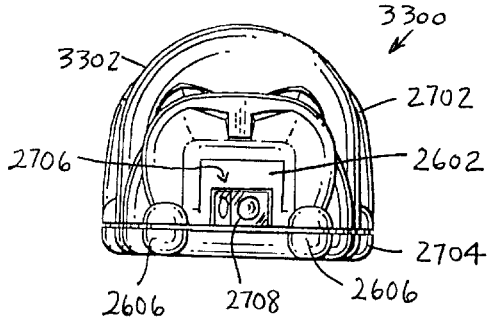
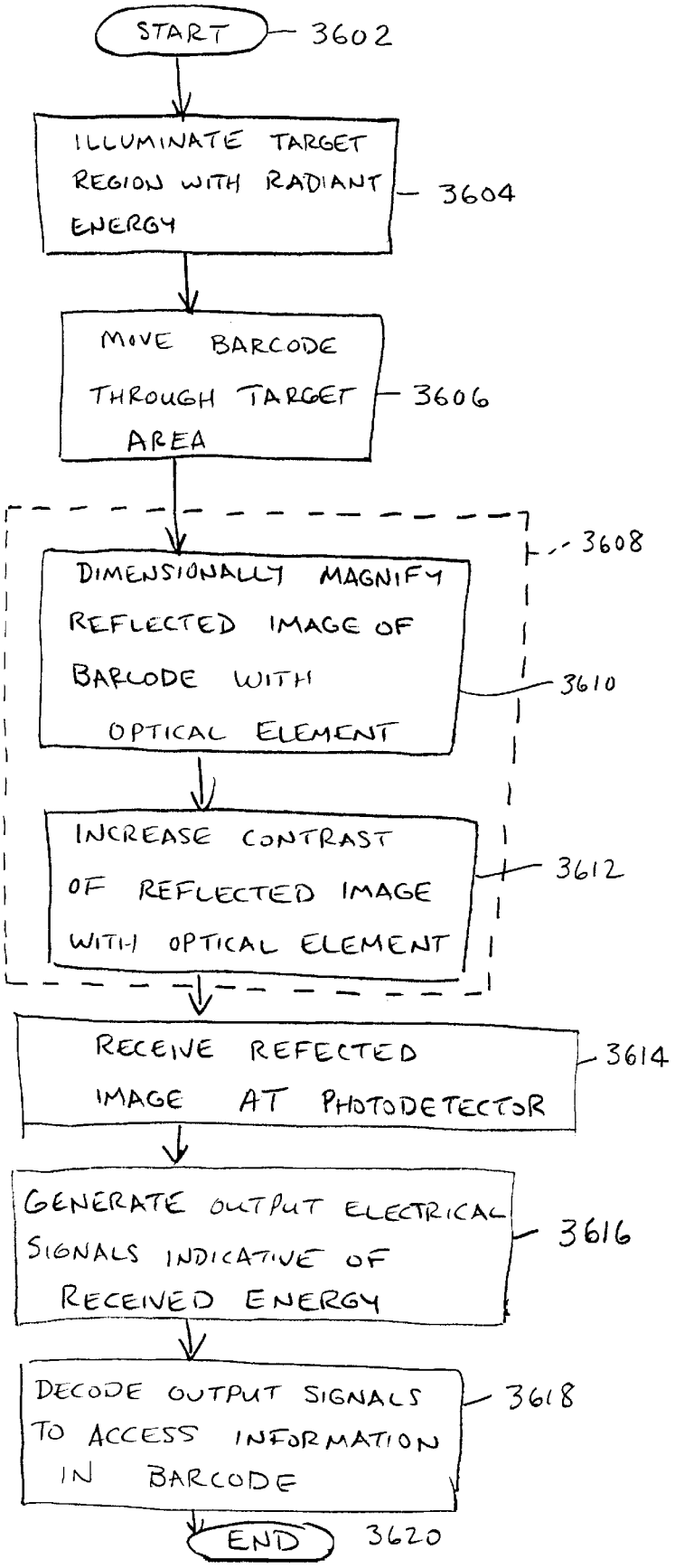



FIG. 35

FIG. 36


START
3602
ILLUMINATE TARGET REGION WITH RADIANT ENERGY
3604
MOVE BARCODE THROUGH TARGET AREA
3606
3608
DIMENSIONALLY MAGNIFY REFLECTED IMAGE OF BARCODE WITH OPTICAL ELEMENT
3610
INCREASE CONTRAST OF REFLECTED IMAGE WITH OPTICAL ELEMENT
3612
RECEIVE REFECTED IMAGE AT PHOTODETECTOR
3614
GENERATE OUTPUT ELECTRICAL SIGNALS INDICATIVE OF RECEIVED ENERGY
3616
DECODE OUTPUT SIGNALS TO ACCESS INFORMATION IN BARCODE
3618
END
3620

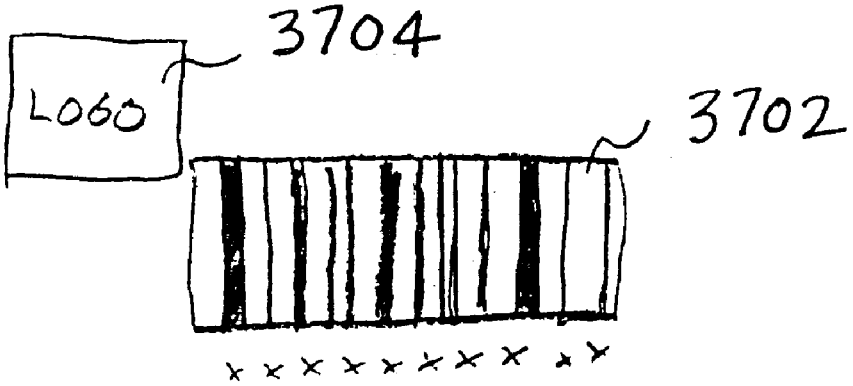



FIG. 37a

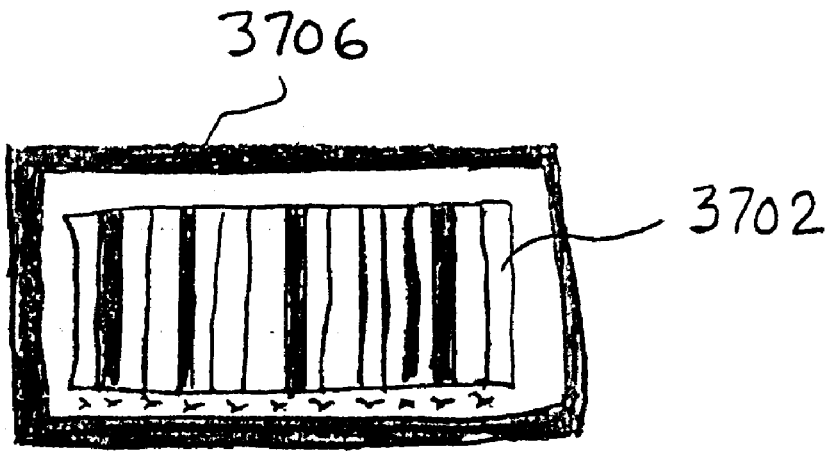



FIG. 37b

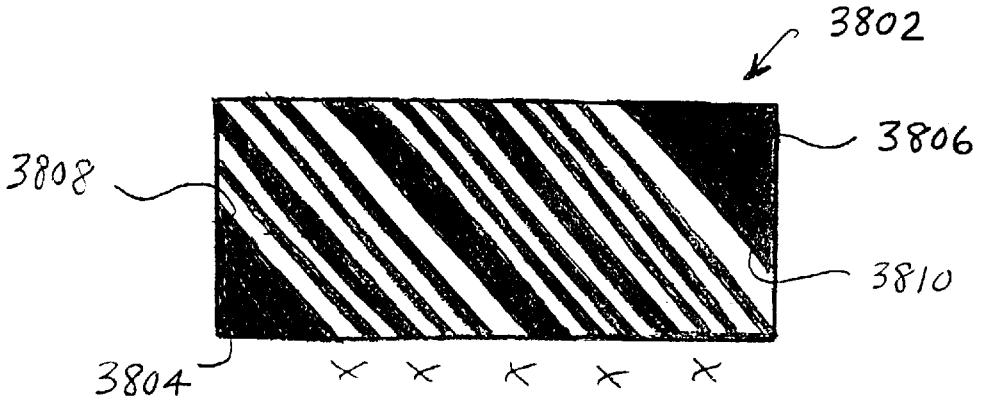



FIG. 38a

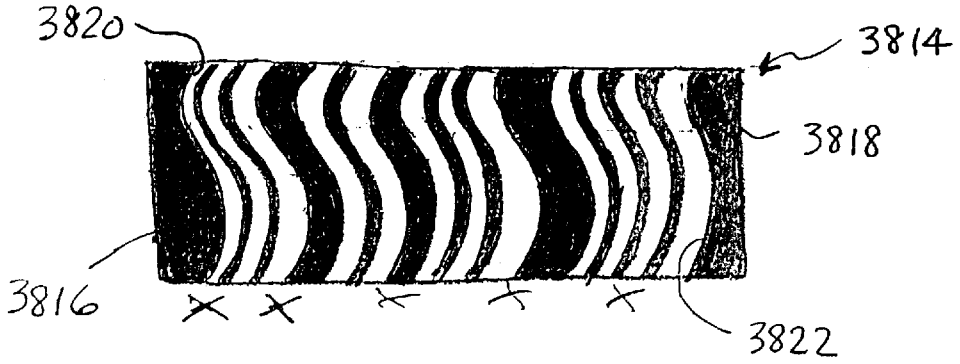



FIG. 38b

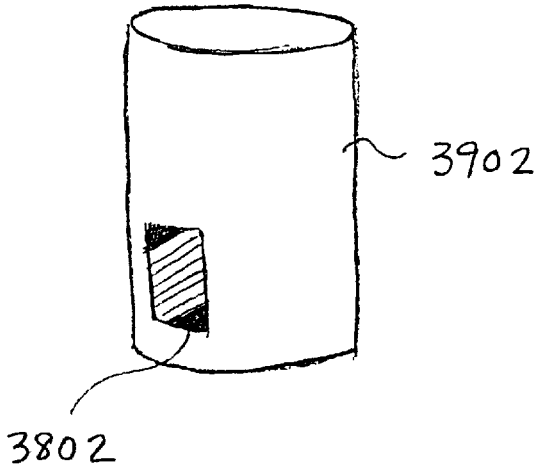



FIG. 39

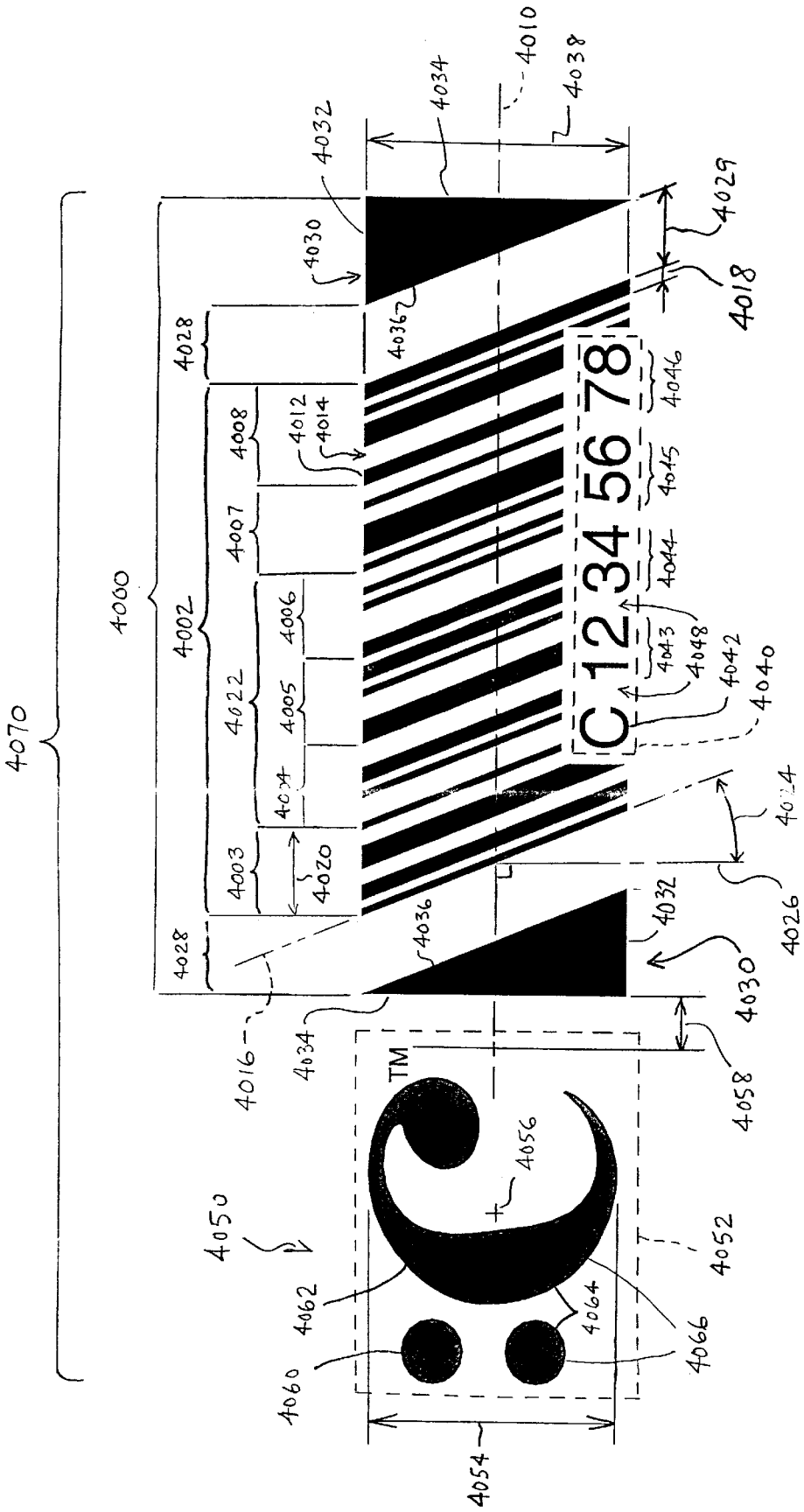

4070
4060
4002
4003
4004
4005
4006
4007
4008
4012
4014
4020
4022
4028
4016
4034
4036
4032
4030
4010
4038
4029
4018
4026
4024
4040
4042
4048
4043
4044
4045
4046
4058
4050
4062
4064
4066
4052
4054
4056
TM
C 12 34 56 78

FIG. 40

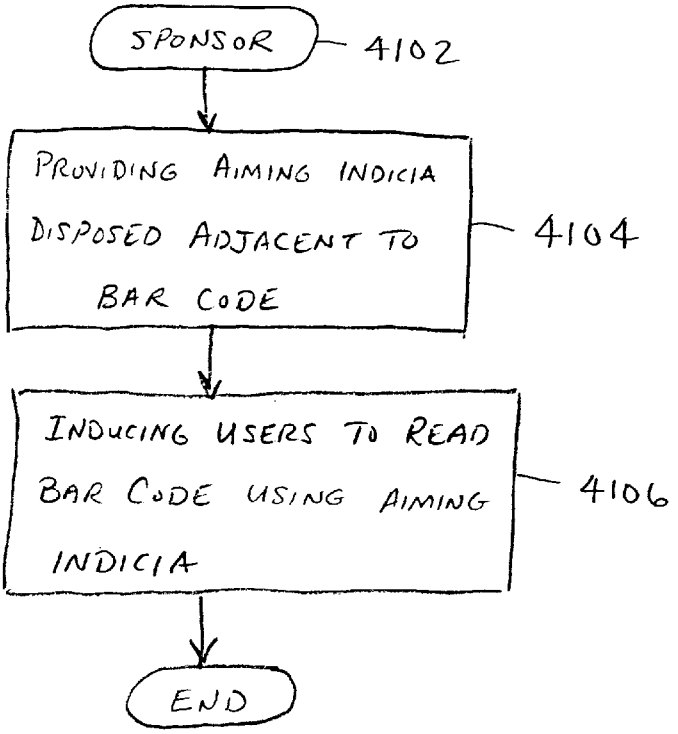

SPONSOR
4102
PROVIDING AIMING INDICIA DISPOSED ADJACENT TO BAR CODE
4104
INDUCING USERS TO READ BAR CODE USING AIMING INDICIA
4106
END

FIG. 41

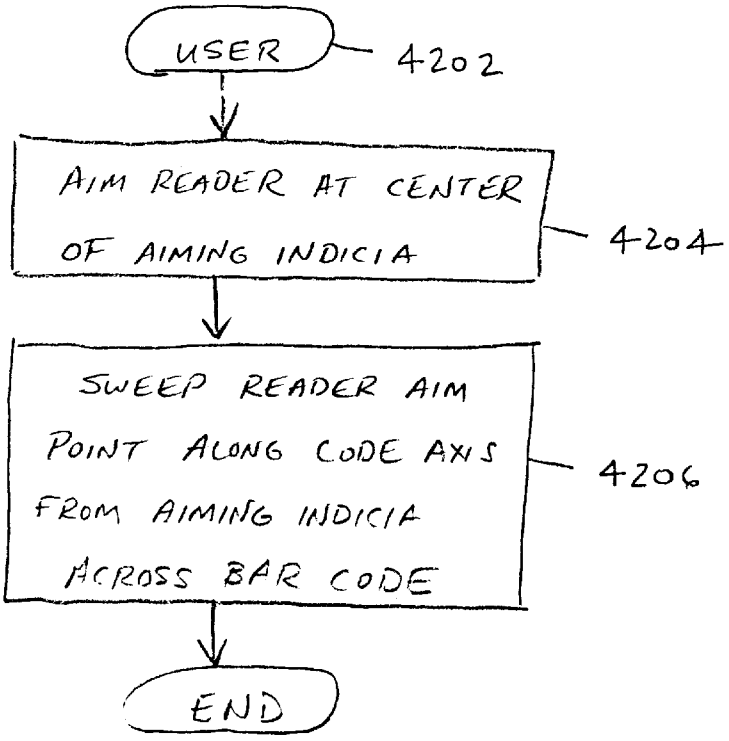

USER
4202
AIM READER AT CENTER OF AIMING INDICIA
4204
SWEEP READER AIM POINT ALONG CODE AXIS FROM AIMING INDICIA ACROSS BAR CODE
4206
END

FIG. 42

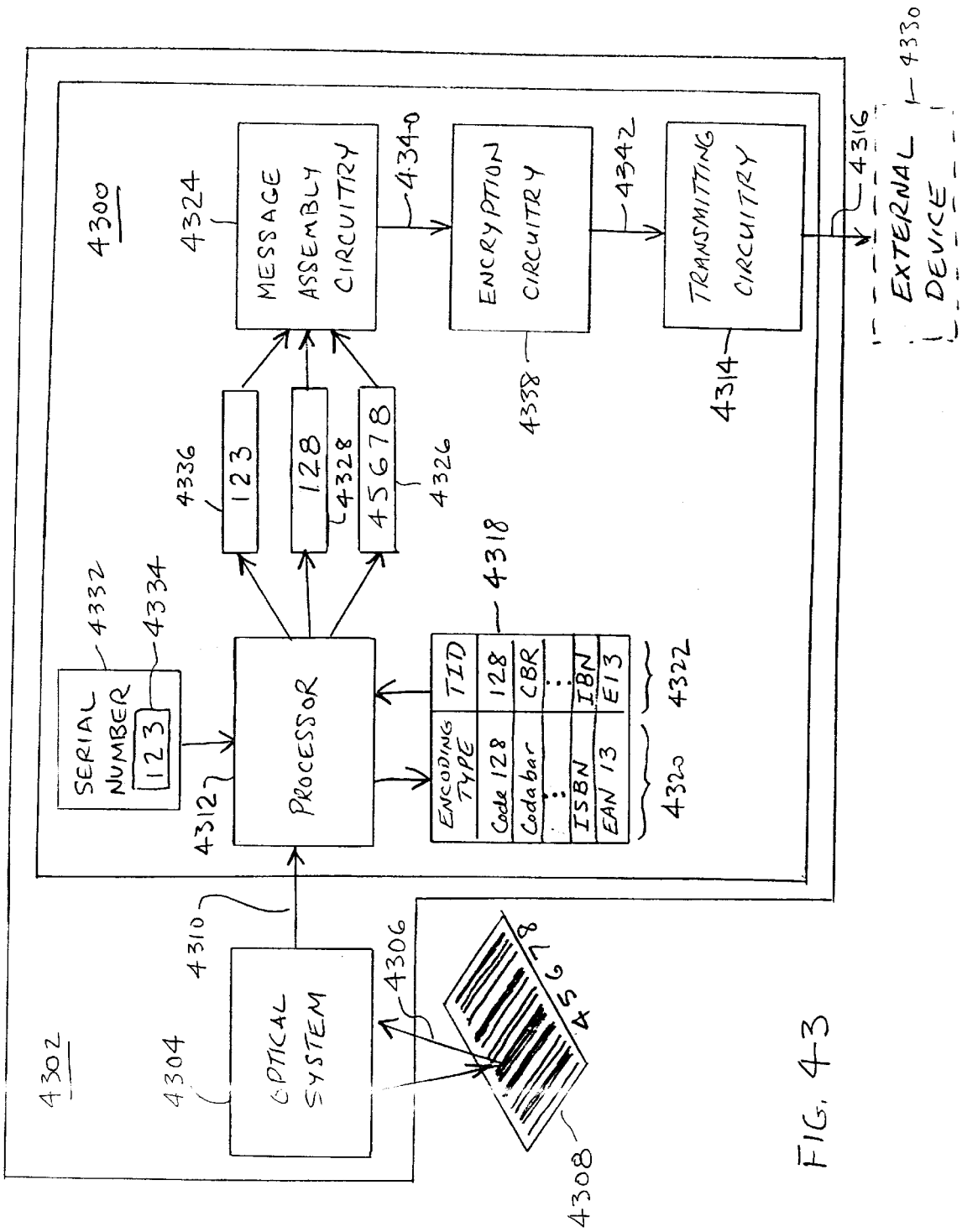

4302
4300
4304
OPTICAL SYSTEM
4306
4308
4310
4312
PROCESSOR
SERIAL NUMBER
123
4332
4334
4336
123
128
45678
4326
4328
4318
ENCODING TYPE
TID
Code 128
128
Codabar
CBR
ISBN
IBN
EAN 13
E13
4320
4322
4324
MESSAGE ASSEMBLY CIRCUITRY
4340
ENCRYPTION CIRCUITRY
4338
4342
TRANSMITTING CIRCUITRY
4314
4316
EXTERNAL DEVICE
4330

FIG. 43

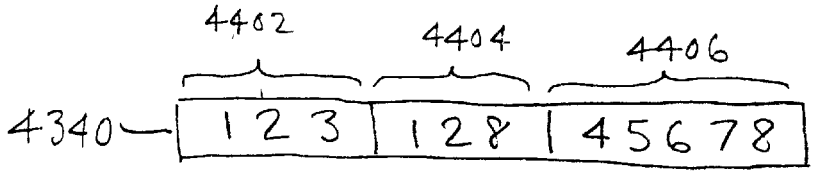



FIG. 44

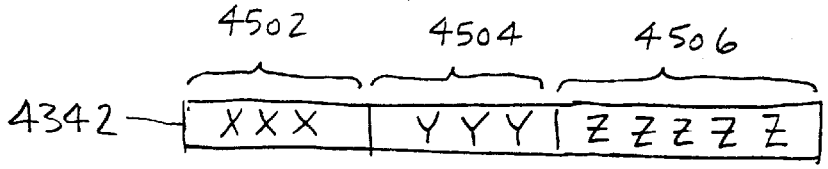



FIG. 45

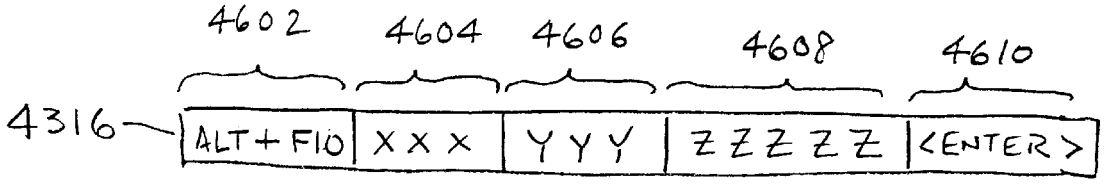



FIG. 46

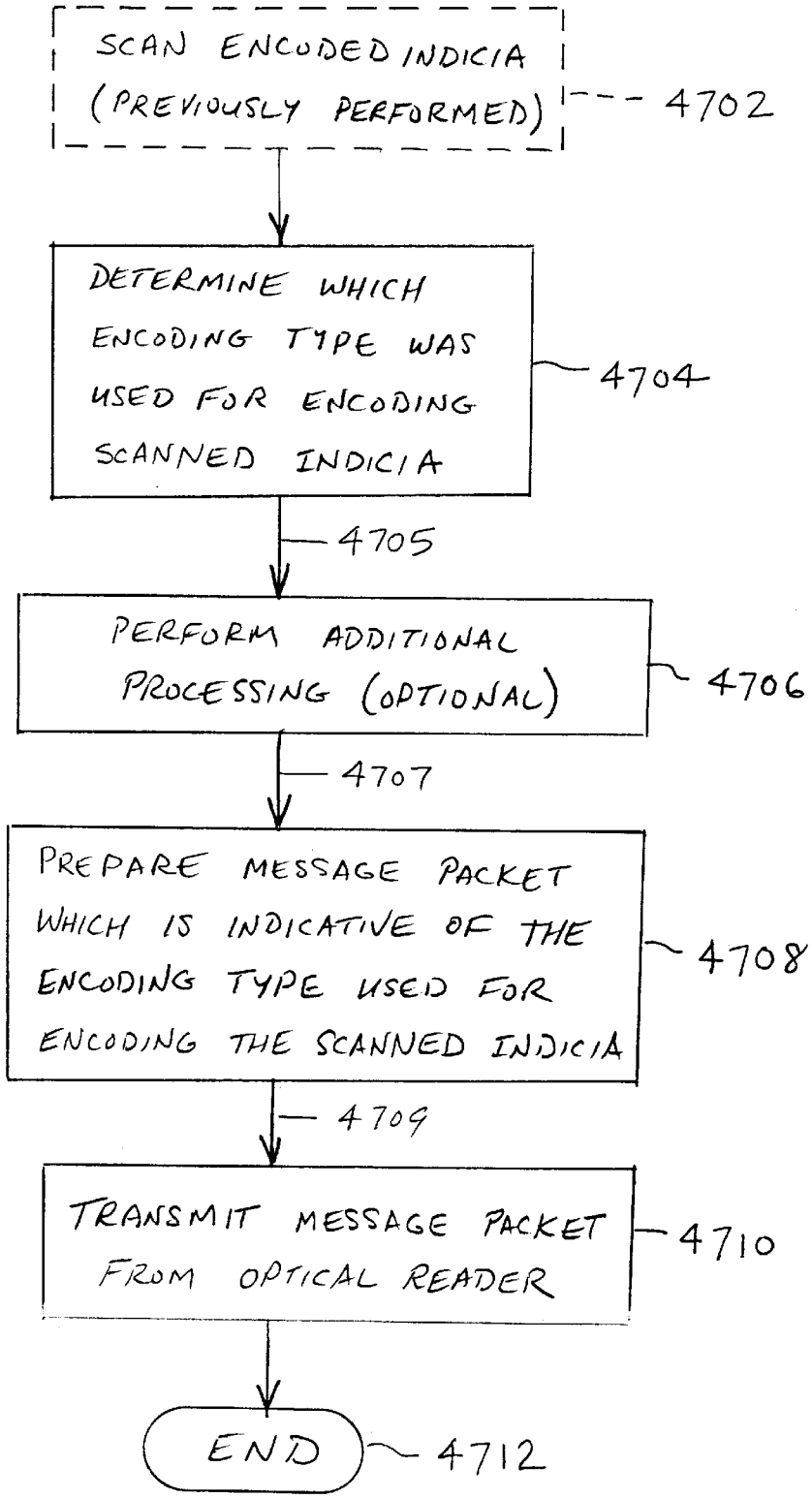

SCAN ENCODED INDICIA (PREVIOUSLY PERFORMED)
4702
DETERMINE WHICH ENCODING TYPE WAS USED FOR ENCODING SCANNED INDICIA
4704
4705
PERFORM ADDITIONAL PROCESSING (OPTIONAL)
4706
4707
PREPARE MESSAGE PACKET WHICH IS INDICATIVE OF THE ENCODING TYPE USED FOR ENCODING THE SCANNED INDICIA
4708
4709
TRANSMIT MESSAGE PACKET FROM OPTICAL READER
4710
END
4712

FIG. 47

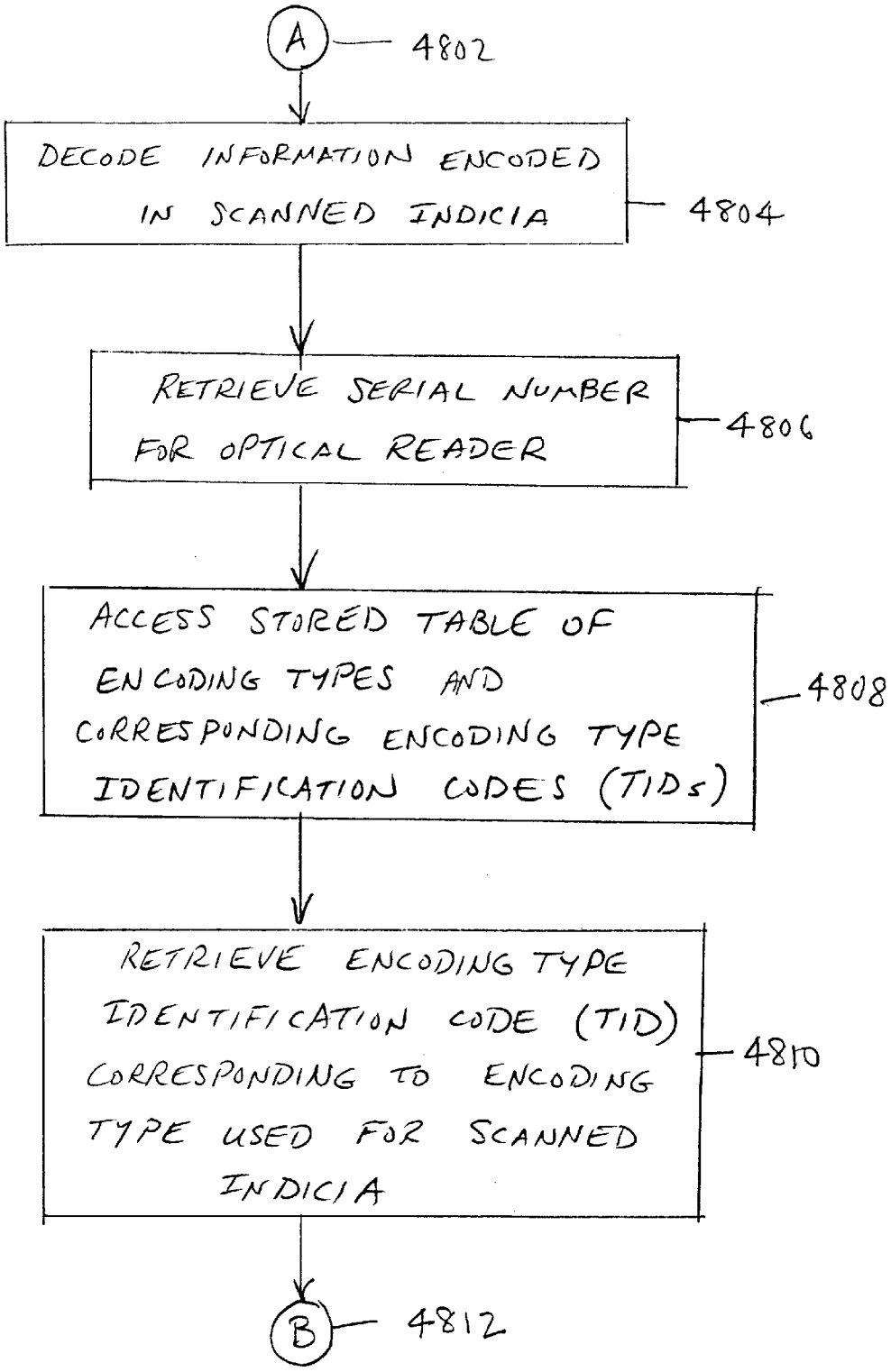

A
4802
DECODE INFORMATION ENCODED IN SCANNED INDICIA
4804
RETRIEVE SERIAL NUMBER FOR OPTICAL READER
4806
ACCESS STORED TABLE OF ENCODING TYPES AND CORRESPONDING ENCODING TYPE IDENTIFICATION CODES (TIDs)
4808
RETRIEVE ENCODING TYPE IDENTIFICATION CODE (TID) CORRESPONDING TO ENCODING TYPE USED FOR SCANNED INDICIA
4810
B
4812

FIG. 48

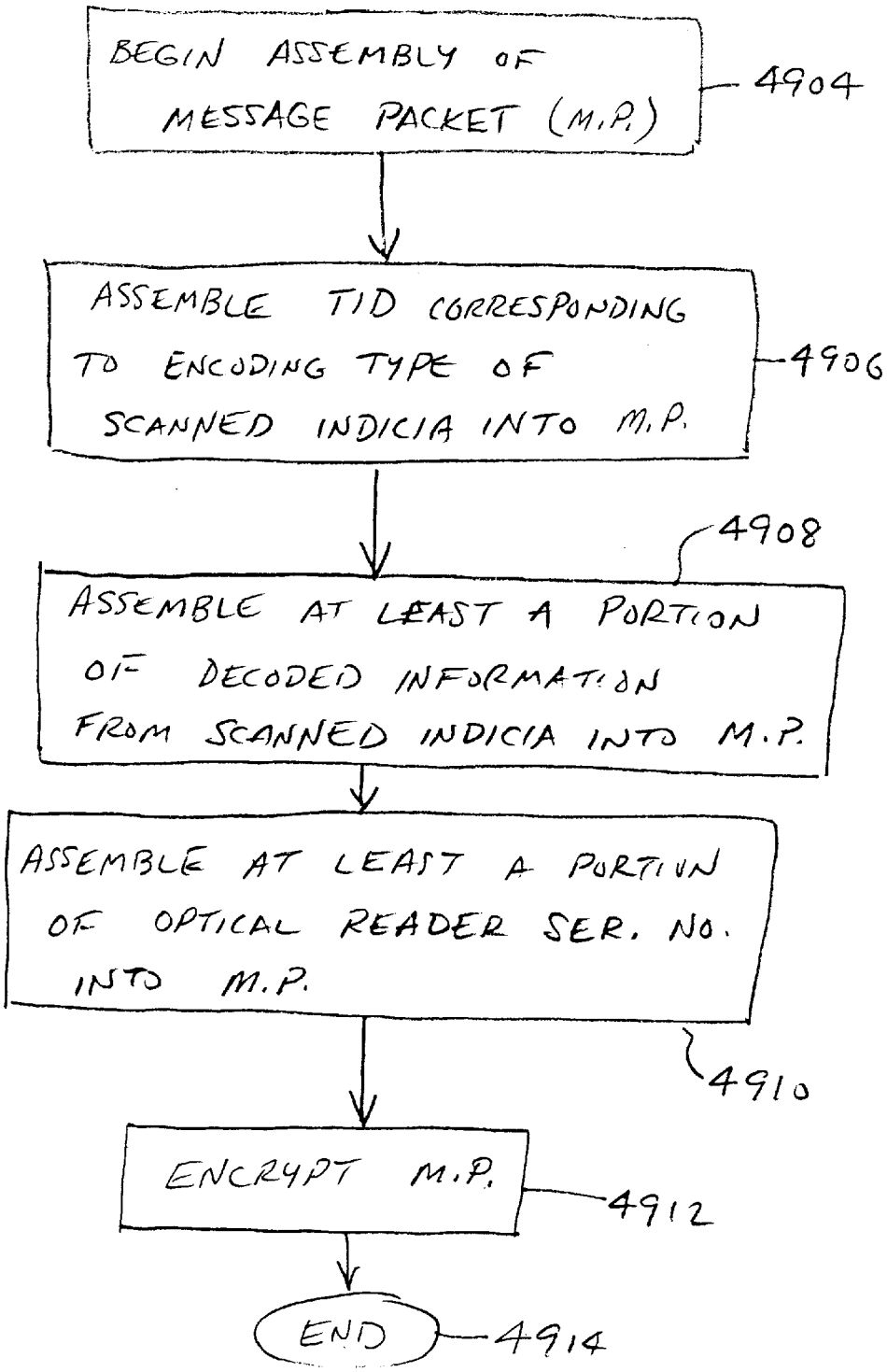

BEGIN ASSEMBLY OF MESSAGE PACKET (M.P.)
4904
ASSEMBLE TID CORRESPONDING TO ENCODING TYPE OF SCANNED INDICIA INTO M.P.
4906
4908
ASSEMBLE AT LEAST A PORTION OF DECODED INFORMATION FROM SCANNED INDICIA INTO M.P.
ASSEMBLE AT LEAST A PORTION OF OPTICAL READER SER. NO. INTO M.P.
4910
ENCRYPT M.P.
4912
END
4914

FIG. 49

# METHOD AND SYSTEM FOR DATA TRANSMISSION FROM AN OPTICAL READER

## CROSS REFERENCE TO RELATED APPLICATION

This application is a Continuation-In-Part of U.S. patent application Ser. No. 09/583,134 filed May 30, 2000 and entitled "UNIQUE BAR CODE", which is a Continuation-In-Part of the following two pending U.S. patent application Ser. No. 09/382,421 filed Aug. 24, 1999 and entitled "A COMBINED PRODUCT CODE AND INSIGNIA FOR SIGNIFYING AN INTERNAL INTERACTIVE CODE" and Ser. No. 09/491,136 filed Jan. 26, 2000 and entitled "UNIQUE BAR CODE FOR INDICATING A LINK BETWEEN A PRODUCT AND A REMOTE LOCATION ON A WEB NETWORK", each of which is a Continuation-In-Part of U.S. patent application Ser. No. 09/378,221 filed Aug. 19, 1999 and entitled "METHOD AND APPARATUS FOR ACCESSING A REMOTE LOCATION BY SCANNING AN OPTICAL CODE", which is a Continuation-In-Part of the following two U.S. patent applications: Ser. No. 09/151,471 filed Sep. 11, 1998 and entitled, "METHOD FOR INTERFACING SCANNED PRODUCT INFORMATION WITH A SOURCE FOR THE PRODUCT OVER A GLOBAL NETWORK", and Ser. No. 09/151,530 entitled "METHOD FOR CONTROLLING A COMPUTER WITH AN AUDIO SIGNAL" filed on Sep. 11, 1998, and which issued Aug. 1, 2000 as U.S. Pat. No. 6,098,106.

## TECHNICAL FIELD OF THE INVENTION

This invention relates generally to optical readers of the type used to read bar codes and similar encoded indicia. In one aspect, it relates to a method for data transmission from an optical reader.

## BACKGROUND OF THE INVENTION

With the growing numbers of computer users connecting to the "Internet," many companies are seeking the substantial commercial opportunities presented by such a large user base. For example, one technology which exists allows a television ("TV") signal to trigger a computer response in which the consumer will be guided to a personalized web page. The source of the triggering signal may be a TV, video tape recorder, or radio. For example, if a viewer is watching a TV program in which an advertiser offers viewer voting, the advertiser may transmit a unique signal within the television signal which controls a program known as a "browser" on the viewer's computer to automatically display the advertiser's web page. The viewer then simply makes a selection which is then transmitted back to the advertiser.

In order to provide the viewer with the capability of responding to a wide variety of companies using this technology, a database of company information and Uniform Resource Locator ("URL") codes is necessarily maintained in the viewer's computer, requiring continuous updates. URLs are short strings of data that identify resources on the Internet: documents, images, downloadable files, services, electronic mailboxes, and other resources. URLs make resources available under a variety of naming schemes and access methods such as HTTP, FTP, and Internet mail, addressable in the same simple way. URLs reduce the tedium of "login to this server, then issue this magic command . . . " down to a single click. The Internet uses URLs to specify the location of files on other servers.



A URL includes the type of resource being accessed (e.g., Web, gopher, FTP), the address of the server, and the location of the file. The URL can point to any file on any networked computer. Current technology requires the viewer to perform periodic updates to obtain the most current URL database. This aspect of the current technology is cumbersome since the update process requires downloading information to the viewer's computer. Moreover, the likelihood for error in performing the update, and the necessity of redoing the update in the event of a later computer crash, further complicates the process. Additionally, current technologies are limited in the number of companies which may be stored in the database. This is a significant limitation since world-wide access presented by the Internet and the increasing number of companies connecting to perform on-line E-commerce necessitates a large database.

Many types of optical readers are known, however, their cost and complexity have heretofore limited their use primarily to industrial and commercial users. Now, many new network-based technologies are being developed for home users which involve optical scanning. Thus, a need exists for a simple, low cost optical reader which can be attached to a personal computer.

Many types of bar codes are known for encoding machine-readable information in accordance with existing standards, for example Code 128, EAN 128, Codabar, the EAN 8 and 13 series, the ISBN series, the ISSN series, ITF, the JAN 8 and 13 series, Pharmacode, the UPC-A and -E series, Plessy and Code 39. Such bar codes are used for a variety of commercial purposes including inventory control, retail sales, shipping information, etc. For a number of reasons, including the expansion of computer-based commerce and network-based commercial activities, a need exists for new bar codes which can be distinguished from existing bar codes.

Low cost optical readers which can be attached to personal computers will increase the number of persons having access to bar code technology. However, a relatively small percentage of the public is actually trained in the use of such equipment. A need therefor exists, for bar codes which facilitate accurate reading by inexperienced users.

An optical reader must eventually transmit data regarding the encoded indicia it has scanned to a computer or other device for further processing. A single optical reader may be required to scan indica encoded in accordance with multiple encoding types. The transmitted data must contain sufficient information regarding the scanned indicia to allow the desired further processing to be accomplished successfully. A need therefore exists, for new methods of data transmission from optical readers.

## SUMMARY OF THE INVENTION

The present invention disclosed and claimed herein comprises, in one aspect thereof, a method for transmitting data from an optical reader following scanning by the optical reader of an indica encoding information in accordance with one of a plurality of information encoding types. The method includes determining that a particular one of the plurality of encoding types was used for encoding the scanned indicia. A message packet is then transmitted from the optical reader which is indicative of the particular one of the plurality of encoding types that was used for encoding the scanned indicia.

## BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and the advantages thereof, reference is now made to

the following description taken in conjunction with the accompanying Drawings in which:

FIG. **1** illustrates a block diagram of the preferred embodiment;

FIG. **2** illustrates the computer components employed in this embodiment;

FIG. **3** illustrates system interactions over a global network;

FIGS. **4***a*–**4***e* illustrate the various message packets transmitted between the source PC and network servers used in the preferred embodiment;

FIG. **5** is a flowchart depicting operation of the system according to the preferred embodiment;

FIG. **6** illustrates a flowchart of actions taken by the Advertiser Reference Server ("ARS") server;

FIG. **7** illustrates a flowchart of the interactive process between the source computer and ARS;

FIG. **8** illustrates a web browser page receiving the modified URL/advertiser product data according to the preferred embodiment;

FIG. **9** illustrates a simplified block diagram of the disclosed embodiment;

FIG. **10** illustrates a more detailed, simplified block diagram of the embodiment of FIG. **9**;

FIG. **11** illustrates a diagrammatic view of a method for performing the routing operation;

FIG. **12** illustrates a block diagram of an alternate embodiment utilizing an optical region in the video image for generating the routing information;

FIG. **13** illustrates a block diagram illustrating the generation of a profile with the disclosed embodiment;

FIG. **14** illustrates a flowchart for generating the profile and storing at the ARS;

FIG. **15** illustrates a flowchart for processing the profile information when information is routed to a user;

FIG. **16** illustrates a general block diagram of a disclosed embodiment;

FIG. **17** illustrates the conversion circuit of the wedge interface;

FIG. **18** illustrates a sample message packet transmitted from the user PC to the ARS;

FIG. **19** illustrates a more detailed block diagram of the routing of the message packets between the various nodes;

FIG. **20** illustrates a block diagram of a browser window, according to a disclosed embodiment;

FIG. **21** illustrates a diagrammatic view of information contained in the ARS database;

FIG. **22** illustrates a flowchart of the process of receiving information from the user's perspective;

FIG. **23** illustrates a flowchart according to the ARS;

FIG. **24** illustrates a flowchart of the process performed at the E-commerce node;

FIG. **25** illustrates reading a bar code with an optical reader according to an embodiment of the invention;

FIG. **26** illustrates a top plan view of an optical reader according to an embodiment of the invention;

FIG. **27** illustrates a front elevation view of the optical reader viewed from line **27**—**27** of FIG. **26**;

FIG. **28** illustrates a general functional block diagram of the components of an optical reader in accordance with an embodiment of the invention;

FIG. **29** illustrates the optical reader of FIG. **26** with portions of the outer shell removed to show the interior components;

FIG. **30** illustrates an enlarged view of the optical system of the optical reader while reading a bar code;

FIG. **31** illustrates a perspective view of the detector unit used in an embodiment of the optical reader;

FIG. **32** illustrates an exploded view of the detector unit of FIG. **31**;

FIG. **33** illustrates a top plan view of an optical reader according to another embodiment of the invention;

FIG. **34** illustrates a side elevation view of the optical reader of FIG. **33**;

FIG. **35** illustrates a front elevation view of the optical reader viewed from line **35**—**35** of FIG. **33**;

FIG. **36** illustrates a flowchart of one embodiment of the process for reading a bar code;

FIGS. **37***a* and **37***b* illustrate an operation wherein a bar code is associated with a unique indicia;

FIG. **38***a* illustrates a diagrammatic view of a unique ornamental bar code for being associated with a product;

FIG. **38***b* illustrates an alternate embodiment of an ornamental bar code;

FIG. **39** illustrates a product on which the bar code of FIG. **38***a* is disposed;

FIG. **40** illustrates a unique bar code for encoding machine-readable information;

FIG. **41** illustrates a flowchart for one embodiment of a process for facilitating the manual reading of a bar code from the perspective of the bar code sponsor;

FIG. **42** illustrates a flowchart of the process from the user's perspective;

FIG. **43** illustrates a diagrammatic view of one embodiment of a system for transmitting data from an optical reader;

FIG. **44** illustrates a sample data packet from the message assembly circuitry of the system;

FIG. **45** illustrates the sample data packet from the encryption circuitry of the system;

FIG. **46** illustrates a sample message packet from the transmitting circuitry of the embodiment;

FIG. **47** illustrates a flowchart for one embodiment of a process for transmitting data from an optical reader;

FIG. **48** illustrates a flowchart for the sub-steps of performing further processing in the embodiment of FIG. **47**; and

FIG. **49** illustrates a flowchart for the sub-steps of assembling a message packet in the embodiment.

## DETAILED DESCRIPTION OF THE INVENTION

Referring now to FIG. **1**, there is illustrated a block diagram of a system for controlling a personal computer ("PC") **112** via an audio tone transmitted over a wireless system utilizing a TV. In the embodiment illustrated in FIG. **1**, there is provided a transmission station **101** and a receive station **117** that are connected via a communication link **108**. The transmission station **101** is comprised of a television program source **104**, which is operable to generate a program in the form of a broadcast signal comprised of video and audio. This is transmitted via conventional techniques along channels in the appropriate frequencies. The program source is input to a mixing device **106**, which mixing device is operable to mix in an audio signal. This audio signal is derived from an audio source **100** which comprises a coded audio signal which is then modulated onto a carrier which is

combined with the television program source **104**. This signal combining can be done at the audio level, or it can even be done at the RF level in the form of a different carrier. However, the preferred method is to merely sum the audio signal from the modulator **102** into the audio channel of the program that is generated by the television program source **104**. The output thereof is provided from the mixing device **106** in the form of broadcast signal to an antenna **107**, which transmits the information over the communication link **108** to an antenna **109** on the receive side.

On the receive side of the system, a conventional receiver **110**, such as a television is provided. This television provides a speaker output which provides the user with an audible signal. This is typically associated with the program. However, the receiver **110** in the disclosed embodiment, also provides an audio output jack, this being the type RCA jack. This jack is utilized to provide an audio output signal on a line **113** which is represented by an audio signal **111**. This line **113** provides all of the audio that is received over the communication link **108** to the PC **112** in the audio input port on the PC **112**. However, it should be understood that, although a direct connection is illustrated from the receiver **110** to the PC **112**, there actually could be a microphone pickup at the PC **112** which could pick the audio signal up. In the disclosed embodiment, the audio signal generated by the advertiser data input device **100** is audible to the human ear and, therefore, can be heard by the user. Therefore, no special filters are needed to provide this audio to the PC **112**.

The PC **112** is operable to run programs thereon which typically are stored in a program file area **116**. These programs can be any type of programs such as word processing programs, application programs, etc. In the disclosed embodiment, the program that is utilized in the system is what is referred to as a "browser." The PC **112** runs a browser program to facilitate the access of information on the network, for example, a global communication network known as the "Internet" or the World-Wide-Web ("Web"). The browser is a hypertext-linked application used for accessing information. Hypertext is a term used to describe a particular organization of information within a data processing system, and its presentation to a user. It exploits the computer's ability to link together information from a wide variety of sources to provide the user with the ability to explore a particular topic. The traditional style of presentation used in books employs an organization of the information which is imposed upon it by limitations of the medium, namely fixed sized, sequential paper pages. Hypertext systems, however, use a large number of units of text or other types of data such as image information, graphical information, video information, or sound information, which can vary in size. A collection of such units of information is termed a hypertext document, or where the hypertext documents employ information other than text, hypermedia documents. Multimedia communications may use the Hypertext Transfer Protocol ("HTTP"), and files or formatted data may use the Hypertext Markup Language ("HTML"). This formatting language provides for a mingling of text, graphics, sound, video, and hypertext links by "tagging" a text document using HTML. Data encoded using HTML is often referred to as an "HTML document," an "HTML page," or a "home page." These documents and other Internet resources may be accessed across the network by means of a network addressing scheme which uses a locator referred to as a Uniform Resource Locator ("URL"), for example, "http://www.digital.com."

The Internet is one of the most utilized networks for interconnecting distributed computer systems and allows users of these computer systems to exchange data all over the world. Connected to the Internet are many private networks, for example, corporate or commercial networks. Standard protocols, such as the Transport Control Protocol ("TCP") and the Internet Protocol ("IP") provide a convenient method for communicating across these diverse networks. These protocols dictate how data are formatted and communicated. As a characteristic of the Internet, the protocols are layered in an IP stack. At higher levels of the IP stack, such as the application layer (where HTTP is employed), the user information is more readily visible, while at lower levels, such as the network level (where TCP/IP are used), the data can merely be observed as packets or a stream of rapidly moving digital signals. Superimposed on the Internet is a standard protocol interface for accessing Web resources, such as servers, files, Web pages, mail messages, and the like. One way that Web resources can be accessed is by browsers made by Netscape® and Microsoft Internet Explorer®.

Referring again now to FIG. **1**, the user can load this program with the appropriate keystrokes such that a browser window will be displayed on a display **118**. In one embodiment, the user can run the browser program on the PC **112** such that the browser window is displayed on the display **118**. While watching a preferred program, the user can also view display **118**. When an audio signal is received by the receiver **110** and the encoded information is contained therein that was input thereto by the advertiser, the PC **112** will then perform a number of operations. The first operation, according to the disclosed embodiment, is to extract the audio information within the received audio signal in the form of digital data, and then transmit this digital data to a defined location on the global communication network via a modem connection **114**. This connection will be described hereinbelow. This information will be relayed to a proprietary location and the instructions sent back to the PC **112** as to the location of the advertiser associated with the code, and the PC **112** will then effect a communication link to that location such that the user can view on the display **118** information that the advertiser, by the fact of putting the tone onto the broadcast channel, desires the viewer to view. This information can be in the form of interactive programs, data files, etc. In one example, when an advertisement appears on the television, the tone can be generated and then additional data displayed on the display **118**. Additionally, a streaming video program could be played on the PC received over the network, which streaming video program is actually longer than the advertising segment on the broadcast. Another example would be a sports game that would broadcast the tone in order to allow a user access to information that is not available over the broadcast network, such as additional statistics associated with the sports program, etc.

By utilizing the system described herein with respect to the disclosed embodiment of FIG. **1**, an advertiser is allowed the ability to control a user's PC **112** through the use of tones embedded within a program audio signal. As will described hereinbelow, the disclosed embodiment utilizes particular routing information stored in the PC **112** which allows the encoded information in the received audio signal to route this information to a desired location on the network, and then allow other routing information to be returned to the PC **112** for control thereof to route the PC **112** to the appropriate location associated with that code.

Referring now to FIG. **2**, there is illustrated a computer **204**, similar to computer **112**, connected to display information on display **118**. The computer **204** comprises an

internal audio or "sound" card **206** for receiving the transmitted audio signal through receive antenna **109** and receiver **110**. The sound card **206** typically contains analog-to-digital circuitry for converting the analog audio signal into a digital signal. The digital signal may then be more easily manipulated by software programs. The receiver **110** separates the audio signal from the video signal. A special trigger signal located within the transmitted advertiser audio signal triggers proprietary software running on the computer **204** which launches a communication application, in this particular embodiment, the web browser application located on the PC **204**. Coded advertiser information contained within the audio signal is then extracted and appended with the address of a proprietary server located on the communication network.

The remote server address is in the form of a URL. This appended data, in addition to other control codes, is inserted directly into the web browser application for automatic routing to the communication network. The web browser running on PC **204**, and communicating to the network with an internal modem **208**, in this embodiment, transmits the advertiser information to the remote server. The remote server cross-references the advertiser product information to the address of the advertiser server located on the network. The address of the advertiser server is routed back through the PC **204** web browser to the advertiser server. The advertiser product information is returned to PC **204** to be presented to the viewer on display **118**. In this particular embodiment, the particular advertiser product information displayed is contained within the advertiser's web page **212**. As mentioned above, the audio signal is audible to the human ear. Therefore the audio signal, as emitted from the TV speakers, may be input to the sound card **206** via a microphone. Furthermore, the audio signal need not be a real-time broadcast, but may be on video tapes, CDs, DVD, or other media which may be displayed at a later date. With the imminent implementation of high definition digital television, the audio signal output from the TV may also be digital. Therefore, direct input into a sound card for A/D purposes may not be necessary, but alternative interfacing techniques to accommodate digital-to-digital signal formats would apply.

Referring now to FIG. **3**, there is illustrated a source PC **302**, similar to PCs **204** and **112**, connected to a global communication network ("GCN") **306** through an interface **304**. In this embodiment, the audio signal **111** is received by PC **302** through its sound card **206**. The audio signal **111** comprises a trigger signal which triggers proprietary software into launching a web browser application residing on the PC **302**. The audio signal **111** also comprises advertiser product information which is extracted and appended with URL information of an Advertiser Reference Server ("ARS") **308**. The ARS **308** is a system disposed on the GCN **306** that is defined as the location to which data in the audio signal **111** is to be routed. As such, data in the audio signal **111** will always be routed to the ARS **308**, since a URL is unique on the GCN **306**. Connected to the ARS **308** is a database **310** of product codes and associated manufacturer URLs. The database **310** undergoes a continual update process which is transparent to the user. As companies sign-on, i.e., subscribe, to this technology, manufacturer and product information is added to the database **310** without interrupting operation of the source PC **302** with frequent updates. When the advertiser server address URL is obtained from the ARS database **310**, it and the request for the particular advertiser product information are automatically routed back through the web browser on PC **302**, over to the respective advertiser server for retrieval of the advertiser product information to the PC **302**. Additionally, although the disclosed invention discusses a global communication network, the system is also applicable to LANs, WANs, and peer-to-peer network configurations. It should be noted that the disclosed architecture is not limited to a single source PC **302**, but may comprise a plurality of source PCs, e.g., PC **300** and PC **303**. Moreover, a plurality of ARS **308** systems and advertiser servers **312** may be implemented, e.g., ARS **314**, and advertiser server A **316**, respectively.

The information transactions, in general, which occur between the networked systems of this embodiment, over the communication network, are the following. The web browser running on source PC **302** transmits a message packet to the ARS **308** over Path "A." The ARS **308** decodes the message packet and performs a cross-reference function with product information extracted from the received message packet to obtain the address of an advertiser server **312**. A new message packet is assembled comprising the advertiser server **312** address, and sent back to the source PC **302** over Path "B." A "handoff" operation is performed whereby the source PC **302** browser simply reroutes the information on to the advertiser server **312** over Path "C," with the appropriate source and destination address appended. The advertiser server **312** receives and decodes the message packet. The request-for-advertiser-product-information is extracted and the advertiser **312** retrieves the requested information from its database for transmission back to the source PC **302** over Path "D." The source PC **302** then processes the information, i.e., for display to the viewer. The optional Path "E" is discussed hereinbelow. It should be noted that the disclosed methods are not limited to only browser communication applications, but may accommodate, with sufficient modifications by one skilled in the art, other communication applications used to transmit information over the Internet or communication network.

Referring now to FIG. **4***a*, the message packet **400** sent from the source PC **302** to ARS **308** via Path "A" comprises several fields. One field comprises the URL of the ARS **308** which indicates where the message packet is to be sent. Another field comprises the advertiser product code or other information derived from the audio signal **111**, and any additional overhead information required for a given transaction. The product code provides a link to the address of the advertiser server **312**, located in the database **310**. Yet another field comprises the network address of the source PC **302**. In general, network transmissions are effected in packets of information, each packet providing a destination address, a source address, and data. These packets vary depending upon the network transmission protocol utilized for communication. Although the protocols utilized in the disclosed embodiment are of a conventional protocol suite commonly known as TCP/IP, it should be understood that any protocols providing the similar basic functions can be used, with the primary requirement that a browser can forward the routing information to the desired URL in response to keystrokes being input to a PC. Within the context of this disclosure, "message packet" shall refer to and comprise the destination URL, product information, and source address, even though more than a single packet must be transmitted to effect such a transmission.

Upon receipt of the message packet **400** from source PC **302**, ARS **308** processes the information in accordance with instructions embedded in the overhead information. The ARS **308** specifically will extract the product code information from the received packet **400** and, once extracted, will then decode this product code information. Once decoded,

this information is then compared with data contained within the ARS advertiser database **310** to determine if there is a "hit." If there is no "hit" indicating a match, then information is returned to the browser indicating such. If there is a "hit," a packet **402** is assembled which comprises the address of the source PC **302**, and information instructing the source PC **302** as to how to access, directly in a "handoff" operation, another location on the network, that of an advertiser server **312**. This type of construction is relatively conventional with browsers such as Netscape® and Microsoft Internet Explorer® and, rather than displaying information from the ARS **308**, the source PC **302** can then access the advertiser server **312**. The ARS **308** transmits the packet **402** back to source PC **302** over Path "B." Referring now to FIG. **4***b,* the message packet **402** comprises the address of the source PC **302**, the URL of the advertiser server **312** embedded within instructional code, and the URL of the ARS **308**.

Upon receipt of the message packet **402** by the source PC **302**, the message packet **402** is disassembled to obtain pertinent routing information for assembly of a new message packet **404**. The web browser running on source PC **302** is now directed to obtain, over Path "C," the product information relevant to the particular advertiser server **312** location information embedded in message packet **404**. Referring now to FIG. **4***c,* the message packet **404** for this transaction comprises the URL of the advertiser server **312**, the request-for-product-information data, and the address of the source PC **302**.

Upon receipt of the message packet **404** from source PC **302**, advertiser server **312** disassembles the message packet **404** to obtain the request-for-product-information data. The advertiser server **312** then retrieves the particular product information from its database, and transmits it over Path "D" back to the source PC **302**. Referring now to FIG. **4***d,* the message packet **406** for this particular transaction comprises the address of the source PC **302**, the requested information, and the URL of the advertiser server **312**.

Optionally, the ARS **308** may make a direct request for product information over Path "E" to advertiser server **312**. In this mode, the ARS **308** sends information to the advertiser server **312** instructing it to contact the source PC **302**. This, however, is unconventional and requires more complex software control. The message packet **408** for this transaction is illustrated in FIG. **4***e,* which comprises the URL of the advertiser server **312**, the request-for-product-information data, and the address of the source PC **302**. Since product information is not being returned to the ARS **308**, but directly to the source PC **302**, the message packet **408** requires the return address to be that of the source PC **302**. The product information is then passed directly to PC **302** over Path "D."

Referring now to FIG. **5**, the method for detecting and obtaining product information is as follows. In decision block **500**, a proprietary application running resident on a source computer PC **302** (similar to PC **204** ) monitors the audio input for a special trigger signal. Upon detection of the trigger signal, data following the trigger signal is decoded for further processing, in function block **502**. In function block **504**, the data is buffered for further manipulation. In decision block **506**, a determination is made as to whether the data can be properly authenticated. If not, program flow continues through the "N" signal to function block **520** where the data is discarded. In function block **522**, the program then signals for a retransmission of the data. The system then waits for the next trigger signal, in decision block **500**. If properly authenticated in decision block **506**, program flow continues through the "Y" signal path where the data is then used to launch the web browser application, as indicated in function block **508**. In function block **510**, the web browser receives the URL data, which is then automatically routed through the computer modem **208** to the network interface **304** and ultimately to the network **306**. In function block **514**, the ARS **308** responds by returning the URL of advertiser server **312** to the PC **302**. In function block **516**, the web browser running on the source PC **302**, receives the advertiser URL information from the ARS **308**, and transmits the URL for the product file to the advertiser server **312**. In block **518**, the advertiser server **312** responds by sending the product information to the source PC **302** for processing.

The user may obtain the benefits of this architecture by simply downloading the proprietary software over the network. Other methods for obtaining the software are well-known; for example, by CD, diskette, or pre-loaded hard drives.

Referring now to FIG. **6**, there is illustrated a flowchart of the process the ARS **308** may undergo when receiving the message packet **400** from the source PC **302**. In decision block **600**, the ARS **308** checks for the receipt of the message packet **400**. If a message packet **400** is not received, program flow moves along the "N" path to continue waiting for the message. If the message packet **400** is received, program flow continues along path "Y" for message processing. Upon receipt of the message packet **400**, in function block **602**, the ARS **308** decodes the message packet **400**. The product code is then extracted independently in function block **604** in preparation for matching the product code with the appropriate advertiser server address located in the database **310**. In function block **606**, the product code is then used with a lookup table to retrieve the advertiser server **312** URL of the respective product information contained in the audio signal data. In function block **608**, the ARS **308** then assembles message packet **402** for transmission back to the source PC **302**. Function block **610** indicates the process of sending the message packet **402** back to the source PC **302** over Path "B."

Referring now to FIG. **7**, there is illustrated a flowchart of the interactive processes between the source PC **302** and the advertiser server **312**. In function block **700**, the source PC **302** receives the message packet **402** back from the ARS **308** and begins to decode the packet **402**. In function block **702**, the URL of the advertiser product information is extracted from the message packet **402** and saved for insertion into the message packet **404** to the advertiser server **312**. The message packet **404** is then assembled and sent by the source PC **302** over Path "C" to the advertiser server **312**, in function block **704**. While the source PC **302** waits, in function block **706**, the advertiser server **312** receives the message packet **404** from the source PC **302**, in function block **708**, and disassembles it. The product information location is then extracted from the message packet **404** in function block **710**. The particular product information is retrieved from the advertiser server **312** database for transmission back to the source PC **302**. In function block **712**, the product information is assembled into message packet **406** and then transmitted back to the source PC **302** over Path "D." Returning to the source PC **302** in function block **714**, the advertiser product information contained in the message packet **406** received from the advertiser server **312**, is then extracted and processed in function block **716**.

Referring now to FIG. **8**, after receipt of a trigger signal, a web browser application on a source PC **302** is automatically launched and computer display **800** presents a browser

page **802**. Proprietary software running on the source PC **302** processes the audio signal data after being digitized through the sound card **206**. The software appropriately prepares the data for insertion directly into the web browser by extracting the product information code and appending keystroke data to this information. First, a URL page **804** is opened in response to a Ctrl-O command added by the proprietary software as the first character string. Opening URL page **804** automatically positions the cursor in a field **806** where additional keystroke data following the Ctrl-O command will be inserted. After URL page **804** is opened, the hypertext protocol preamble http:// is inserted into the field **806**. Next, URL information associated with the location of the ARS **308** is inserted into field **806**. Following the ARS **308** URL data are the characters /? to allow entry of variables immediately following the /? characters. In this embodiment, the variable following is the product information code received in the audio signal. The product code information also provides the cross-reference information for obtaining the advertiser URL from the ARS database **310**. Next, a carriage return is added to send the URL/product data and close the window **804**. After the message packet **400** is transmitted to the ARS **308** from the source PC **302**, transactions from the ARS **308**, to the source PC **302**, to the advertiser server **312**, and back to the source PC **302**, occur quickly and are transparent to the viewer. At this point, the next information the viewer sees is the product information which was received from the advertiser server **312**.

Referring now to FIG. **9**, there is illustrated a block diagram of a more simplified embodiment. In this embodiment, a video source **902** is provided which is operable to provide an audio output on an audio cable **901** which provides routing information referred to by reference numeral **904**. The routing information **904** is basically information contained within the audio signal. This is an encoded or embedded signal. The important aspect of the routing information **904** is that it is automatically output in realtime as a function of the broadcast of the video program received over the video source **902**. Therefore, whenever the program is being broadcast in realtime to the user **908**, the routing information **904** will be output whenever the producer of the video desires it to be produced. It should be understood that the box **902** representing the video source could be any type of media that will result in the routing information being output. This could be a cassette player, a DVD player, an audio cassette, a CD ROM or any such media. It is only important that this is a program that the producer develops which the user **908** watches in a continuous or a streaming manner. Embedded within that program, at a desired point selected by the producer, the routing information **904** is output.

The audio information is then routed to a PC **906**, which is similar to the PC **112** in FIG. **1**. A user **908** is interfaced with the PC to receive information thereof, the PC **906** having associated therewith a display (not shown). The PC **906** is interfaced with a network **910**, similar to the network **306** in FIG. **3**. This network **910** has multiple nodes thereon, one of which is the PC **906**, and another of which is represented by a network node **912** which represents remote information. The object of the present embodiment is to access remote information for display to the user **908** by the act of transmitting from the video program in block **902** the routing information **904**. This routing information **904** is utilized to allow the PC **906** which has a network "browser" running thereon to "fetch" the remote information at the node **912** over the network **910** for display to the user **908**. This routing information **904** is in the form of an embedded code within the audio signal, as was described hereinabove.

Referring now to FIG. **10**, there is illustrated a more detailed block diagram of the embodiment of FIG. **9**. In this embodiment, the PC **906** is split up into a couple of nodes, a first PC **1002** and a second PC **1004**. The PC **1002** resides at the node associated with the user **908**, and the PC **1004** resides at another node. The PC **1004** represents the ARS **308** of FIG. **3**. The PC **1004** has a database **1006** associated therewith, which is basically the advertiser database **310**. Therefore, there are three nodes on the network **910** necessary to implement the disclosed embodiment, the PC **1002**, the PC **1004** and the remote information node **912**. The routing information **904** is utilized by the PC **1002** for routing to the PC **1004** to determine the location of the remote information node **912** on the network **910**. This is returned to the PC **1002** and a connection made directly with the remote information node **912** and the information retrieved therefrom to the user **908**. The routing information **904** basically constitutes primary routing information.

Referring now to FIG. **11**, there is illustrated a diagrammatic view of how the network packet is formed for sending the primary routing information to the PC **1004**. In general, the primary routing information occupies a single field which primary routing information is then assembled into a data packet with the secondary routing information for transfer to the network **910**. This is described hereinabove in detail.

Referring now to FIG. **12**, there is illustrated an alternate embodiment to that of FIG. **9**. In this embodiment, the video source **902** has associated therewith an optical region **1202**, which optical region **1202** has disposed therein an embedded video code. This embedded video code could be relatively complex or as simple as a grid of dark and white regions, each region in the grid able to have a dark color for a logic "1" or a white region for a logic "0. " This will allow a digital value to be disposed within the optical region **1202**. A sensor **1204** can then be provided for sensing this video code. In the example above, this would merely require an array of optical detectors, one for each region in the grid to determine whether this is a logic "1" or a logic "0" state. One of the sensed video is then output to the PC **906** for processing thereof to determine the information contained therein, which information contained therein constitutes the primary routing information **904**. Thereafter, it is processed as described hereinabove with reference to FIG. **9**.

Referring now to FIG. **13**, there is illustrated a block diagram for an embodiment wherein a user's profile can be forwarded to the original subscriber or manufacturer. The PC **906** has associated therewith a profile database **1302**, which profile database **1302** is operable to store a profile of the user **908**. This profile is created when the program, after initial installation, requests profile information to be input in order to activate the program. In addition to the profile, there is also a unique ID that is provided to the user **908** in association with the browser program that runs on the PC **906**. This is stored in a storage location represented by a block **1304**. This ID **1304** is accessible by a remote location as a "cookie" which is information that is stored in the PC **906** in an accessible location, which accessible location is actually accessible by the remote program running on a remote node.

The ARS **308**, which basically constitutes the PC **1004** of FIG. **10**, is operable to have associated therewith a profile database **1308**, which profile database **1308** is operable to information store profiles for all of the users. The profile database **1308** is a combination of the stored in profile database **1302** for all of the PCs **906** that are attachable to the system. This is to be distinguished from information stored

in the database **310** of the ARS **308**, the advertiser's database, which contains intermediate destination tables. When the routing information in the primary routing information **904** is forwarded to the ARS **308** and extracted from the original data packet, the lookup procedure described hereinabove can then be performed to determine where this information is to be routed. The profile database **1302** is then utilized for each transaction, wherein each transaction in the form of the routing information received from the primary routing information **904** is compared to the destination tables of database **310** to determine what manufacturer is associated therewith.

The associated ID **1304** that is transmitted along with the routing information in primary routing information **904** is then compared with the profile database **1308** to determine if a profile associated therewith is available. This information is stored in a transaction database **1310** such that, at a later time, for each routing code received in the form of the information in primary routing information **904**, there will associated therewith the IDs **1304** of each of the PCs **906**. The associated profiles in database **1308**, which are stored in association with IDs **1304**, can then be assembled and transmitted to a subscriber as referenced by a subscriber node **1312** on the network **910**. The ARS **308** can do this in two modes, a realtime mode or a non-realtime mode. In a realtime mode, each time a PC **906** accesses the advertiser database **310**, that user's profile information is uploaded to the subscriber node **1312**. At the same time, billing information is generated for that subscriber **1312** which is stored in a billing database **1316**. Therefore, the ARS **308** has the ability to inform the subscriber **1312** of each transaction, bill for those transactions, and also provide to the subscriber **1312** profile information regarding who is accessing the particular product advertisement having associated therewith the routing information field **904** for a particular routing code as described hereinabove. This information, once assembled, can then be transmitted to the subscriber **1312** and also be reflected in billing information and stored in the billing information database **1316**.

Referring now to FIG. **14**, there is illustrated a flowchart depicting the operation for storing the profile for the user. The program is initiated in a block **1402** and then proceeds to a function block **1404**, wherein the system will prompt for the profile upon initiation of the system. This initiation is a function that is set to activate whenever the user initially loads the software that he or she is provided. The purpose for this is to create, in addition to the setup information, a user profile. Once the user is prompted for this, then the program will flow to a decision block **1406** to determine whether the user provides basic or detailed information. This is selectable by the user. If selecting basic, the program will flow to a function block **1408** wherein the user will enter basic information such as name and serial number and possibly an address. However, to provide some incentive to the user to enter more information, the original prompt in function block **1404** would have offers for such things as coupons, discounts, etc., if the user will enter additional information. If the user selects this option, the program flows from the decision block **1406** to a function block **1410**. In the function block **1410**, the user is prompted to enter specific information such as job, income level, general family history, demographic information and more. There can be any amount of information collected in this particular function block.

Once all of the information is collected, in either the basic mode or the more specific mode, the program will then flow to a function block **1412** where this information is stored locally. The program then flows to a decision block **1414** to then go on-line to the host or the ARS **308**. In general, the user is prompted to determine whether he or she wants to send this information to the host at the present time or to send it later. If he or she selects the "later" option, the program will flow to a function block **1415** to prompt the user at a later time to send the information. In the disclosed embodiment, the user will not be able to utilize the software until the profile information is sent to the host. Therefore, the user may have to activate this at a later time in order to connect with the host.

If the user has selected the option to upload the profile information to the host, the program will flow to the function block **1416** to initiate the connect process and then to a decision block **1418** to determine if the connection has been made. If not, the program will flow along a "N" path to a decision block **1420** which will timeout to an error block **1422** or back to the input of the connect decision block **1418**. The program, once connected, will then flow along a "Y" path from decision block **1418** to a function block **1428** to send the profile information with the ID of the computer or user to the host. The ID is basically, as described hereinabove, a "cookie" in the computer which is accessed by the program when transmitting to the host. The program will then flow to a function block **1430** to activate the program such that it, at later time, can operate without requiring all of the setup information. In general, all of the operation of this flowchart is performed with a "wizard" which steps the user through the setup process. Once complete, the program will flow to a Done block **1432**.

Referring now to FIG. **15**, there is illustrated a flowchart depicting the operation of the host when receiving a transaction. The program is initiated at a Start block **1502** and then proceeds to decision block **1504**, wherein it is determined whether the system has received a routing request, i.e., the routing information **904** in the form of a tone, etc., embedded in the audio signal, as described hereinabove with respect to FIG. **9**. The program will loop back around to the input of decision block **1504** until the routing request has been received. At this time, the program will flow along the "Y" path to a function block **1506** to receive the primary routing information and the user ID. Essentially, this primary routing information is extracted from the audio tone, in addition to the user ID. The program then flows to a function block **1508** to look up the manufacturer URL that corresponds to the received primary routing information and then return the necessary command information to the originating PC **112** in order to allow that PC **112** to connect to the destination associated with the primary routing information. Thereafter, the program will flow to a function block **1510** to update the transaction database **1310** for the current transaction. In general, the routing information **904** will be stored as a single field with the associated IDs. The profile database **1308**, as described hereinabove, has associated therewith detailed profiles of each user on the system that has activated their software in association with their ID. Since the ID was sent in association with the routing information, what is stored in the transaction database **1310** is the routing code, in association with all of the IDs transmitted to the system in association with that particular routing code. Once this transaction database **1310** has been updated, as described hereinabove, the transactions can be transferred back to the subscriber at node **312** with the detailed profile information from the profile database **1308**.

The profile information can be transmitted back to the subscriber or manufacturer at the node **312** in realtime or non-realtime. A decision block **1512** is provided for this,

which determines if the delivery is realtime. If realtime, the program will flow along a "Y" path to a function block **1514** wherein the information will be immediately forwarded to the manufacturer or subscriber. The program will then flow to a function block **1516** wherein the billing for that particular manufacturer or subscriber will be updated in the billing database **1316**. The program will then flow into an End block **1518**. If it was non-realtime, the program moves along the "N" path to a function block **1520** wherein it is set for a later delivery and it is accrued in the transaction database **1310**. In any event, the transaction database **1310** will accrue all information associated with a particular routing code.

With a realtime transaction, it is possible for a manufacturer to place an advertisement in a magazine or to place a product on a shelf at a particular time. The manufacturer can thereafter monitor the times when either the advertisements are or the products are purchased. Of course, they must be scanned into a computer which will provide some delay. However, the manufacturer can gain a very current view of how a product is moving. For example, if a cola manufacturer were to provide a promotional advertisement on, for example, television, indicating that a new cola was going to be placed on the shelf and that the first 1000 purchasers, for example, scanning their code into the network would receive some benefit, such as a chance to win a trip to some famous resort in Florida or some other incentive, the manufacturer would have a very good idea as to how well the advertisement was received. Further, the advertiser would know where the receptive markets were. If this advertiser, for example, had placed the television advertisement in ten cities and received overwhelming response from one city, but very poor response from another city, he would then have some inclination to believe that either the one poor-response city was not a good market or that the advertising medium he had chosen was very poor. Since the advertiser can obtain a relatively instant response and also content with that response as to the demographics of the responder, very important information can be obtained in a relatively short time.

It should be noted that the disclosed embodiment is not limited to a single source PC **302**, but may encompass a large number of source computers connected over a global communication network. Additionally, the embodiment is not limited to a single ARS **308** or a single advertiser server **312**, but may include a plurality of ARS and advertiser systems, indicated by the addition of ARS **314** and advertiser server A **316**, respectively. It should also be noted that this embodiment is not limited only to global communication networks, but also may be used with LAN, WAN, and peer-to-peer configurations.

It should also be noted that the disclosed embodiment is not limited to a personal computer, but is also applicable to, for example, a Network Computer ("NetPC"), a scaled-down version of the PC, or any system which accommodates user interaction and interfaces to information resources.

One typical application of the above noted technique is for providing a triggering event during a program, such as a sport event. In a first example, this may be generated by an advertiser. One could imagine that, due to the cost of advertisements in a high profile sports program, there is a desire to utilize this time wisely. If, for example, an advertiser contracted for 15 seconds worth of advertising time, they could insert within their program a tone containing the routing information. This routing information can then be output to the user's PC **302** which will cause the user's PC **302** to, via the network, obtain information from a remote location typically controlled by the advertiser. This could be in the form of an advertisement of a length longer than that contracted for. Further, this could be an interactive type of advertisement. An important aspect to the type of interaction between the actual broadcast program with the embedded routing information and the manufacturer's site is the fact that there is provided information as to the user's PC **302** and a profile of the user themselves. Therefore, an advertiser can actually gain realtime information as to the number of individuals that are watching their particular advertisement and also information as to the background of those individuals, profile information, etc. This can be a very valuable asset to an advertiser.

In another example, the producer of the program, whether it be an on-air program, a program embedded in a video tape, CD-ROM, DVD, or a cassette, can allow the user to automatically access additional information that is not displayed on the screen. For example, in a sporting event, various statistics can be provided to the user from a remote location, merely by the viewer watching the program. When these statistics are provided, the advertiser can be provided with profile information and background information regarding the user. This can be important when, for example, the user may record a sports program. If the manufacturer sees that this program routing code is being output from some device at a time later than the actual broadcast itself, this allows the advertisers to actually see that their program is still being used and also what type of individual is using it. Alternatively, the broadcaster could determine the same and actually bill the advertiser an additional sum for a later broadcast. This is all due to the fact that the routing information automatically, through a PC and a network, will provide an indication to the advertiser the time at which the actual information was broadcast.

The different type of medium that can be utilized with the above embodiment are such things as advertisements, which are discussed hereinabove, contests, games, news programs, education, coupon promotional programs, demonstration media (demos), and photographs, all of which can be broadcast on a private site or a public site. This all will provide the ability to allow realtime interface with the network and the remote location for obtaining the routed information and also allow for realtime billing and accounting.

Referring now to FIG. **16**, there is illustrated a general block diagram of a disclosed embodiment. A bar code scanning input device **1600** is provided by a input device distributor to customers and is associated with that distributor via a input device ID stored therein. The input device **1600** is either sold or freely distributed to customers for use with their personal computing systems. Since more and more products are being sold using bar codes, it can be appreciated that a user having the input device **1600** can scan bar codes of a multitude of products in order to obtain more information. Information about these products can be made immediately available to the user from the manufacturer for presentation by the user's computer **302**. Beyond simply displaying information about the product in which the user is interested, the input device distributor may include additional advertising information for display to the user such as information about other promotions or products provided or sold by the input device distributor. Similarly, advertisers may provide catalogs of advertisements or information in newspapers or periodicals where the user simply scans the bar code associated with the advertisement using the input device **1600** to obtain further information. There is provided a paper source **1602** having contained thereon an advertise-

ment **1604** and an associated bar code **1606**. (Note that the disclosed concept is not limited to scanning of bar codes **1606** from paper sources **1602**, but is also operable to scan a bar code **1606** on the product itself. Also, the input device **1600** can be any type of device that will scan any type of image having information encoded therein.)

After obtaining the input device **1600** from the input device distributor, the user connects the input device **1600** to their PC **302**. During a scanning operation, input device **1600** reads bar code data **1606** and the input device ID into a "wedge" interface **1608** for conversion into keyboard data, which keyboard data is passed therefrom into the keyboard input port of PC **302**. The importance of the input device ID will be discussed in more detail hereinbelow.

The wedge interface **1608** is simply an interface box containing circuitry that accommodates inputs from both the scanning input device **1600** and a computer keyboard **1610**. This merely allows the information scanned by the input device **1600** to be input into the PC **302**. In the disclosed embodiment, the wedge interface **1608** will convert any information. The data output from the input device **1600** is passed into the wedge interface **1608** for conversion into keyboard data which is readily recognizable by the PC **302**. Therefore, the input device **1600** is not required to be connected to a separate port on the PC **302**. This data is recognized as a sequence of keystrokes. However, the output of the input device **1600** can be input in any manner compatible with the PC **302**. When not receiving scanner data, the wedge interface **1608** simply acts as a pass-through device for keyboard data from the keyboard **1610**. In any case, the information is ultimately processed by a processor in the PC **302** and can be presented to the user on a display **1612**. The wedge interface **1608** is operable to provide a decoding function for the bar code **1606** and conversion thereof to keystroke input data.

In operation, the product code of a product is provided in the form of a bar code **1606**. This bar code **1606** is the "link" to a product. The disclosed embodiment is operable to connect that product information contained in the bar code **1606** with a web page of the manufacturer of that product by utilizing the bar code **1606** as the product "identifier." The program operating on the PC **302** provides routing information to the ARS **308** after launching the browser on the PC **302** and connecting to the ARS **308** over the GCN **306**, which ARS **308** then performs the necessary steps to cause the browser to connect to the manufacturer web site, while also providing for an accounting step, as will be described in more detail hereinbelow.

The bar code **1606** by itself is incompatible with any kind of network for the purposes of communication therewith. It is primarily provided for a retail-type setting. Therefore, the information contained in the bar code **1606**, by itself, does not allow for anything other than identification of a product, assuming that one has a database **1614** containing information as to a correlation between the product and the bar code **1606**.

The wedge interface **1608** is operable to decode the bar code **1606** to extract the encoded information therein, and append to that decoded bar code information relating to an ID for the input device **1600**. This information is then forwarded to the ARS **308** by the resident program in the PC **302**. This is facilitated by intermediate routing information stored in the program indicating to which node on the GCN **306** the scanned bar code information is to be sent, i.e., to the ARS **308**. It is important to note that the information in the bar code **1606** must be converted from its optical image to numerical values which are then ultimately input to the keyboard input port of PC **302** and converted into data compatible with communication software residing on the PC **302** (in this case, HTML language for insertion into a browser program). When the scanned information is input to the PC **302**, the resident program launches the browser program and then assembles a communication packet comprised of the URL of the ARS **308**, the input device ID and the user ID. If another type of communications program were utilized, then it would have to be converted into language compatible with that program. Of course, a user could actually key in the information on the bar code **102** and then append the appropriate intermediate routing information thereafter. As will be described hereinbelow, the intermediate routing information appended thereto is the URL of the ARS **308** disposed on the GCN **306**.

As part of the configuration for using the input device **1600**, the PC **302** hosts input device software which is operable to interpret data transmitted from the input device **1600**, and to create a message packet having the scanned product information and input device ID, routing information, and a user ID which identifies the user location of the input device **1600**. The input device software loads at boot-up of the PC **302** and runs in the background. In response to receiving a scanned bar code **1606**, the wedge interface **1608** outputs a keystroke code (e.g., ALT-F10) to bring the input device program into the foreground for interaction by the operating system. The input device program then inserts the necessary information into the browser program. The message packet is then transmitted to interface **304** across the global communication network **306** to the ARS **308**. The ARS **308** interrogates the message packet and performs a lookup function using the ARS database **310**. If a match is found between particular parameters of the message packet, a return message packet is sent back to the PC **302** for processing.

The input device program running on PC **302** functions to partition the browser window displayed to the user into several individual areas. This is for the purpose of preparing to present to the user selected information in each of the individual areas (also called "framing"). The selected information comprises the product information which the user requested by scanning the bar code **1606** using the input device **1600**, information about the input device distributor which establishes the identity of the company associated with that particular input device **1600**, and at least one or more other frames which may be advertisements related to other products that the input device distributor sells. Note that the advertisements displayed by the input device distributor may be related to the product of interest or totally unrelated. For example, if a user scans the bar code **1606** of a soda from Company A, the input device distributor may generate an advertisement of a new soft drink being marketed by Company A, that it sells. On the other hand, the input device distributor may also structure the display of information to the user such that a user requesting product information of a Product X may get the requested information of Product X along with advertisements for a competing item Product Y. Essentially, the input device distributor is free to generate any advertisement to the user in response to the user requesting product information.

The return message packet transmitted from the ARS **308** to the PC **302** is then transmitted back across the GCN **306** to the advertiser server **312**. The advertiser server **312** restructures the message packet and appends the particular product information for transmission back to the PC **302**. Upon receiving the particular advertiser information from

advertiser server **312**, the PC **302** then retransmits a message to the input device distributor site **1616** and E-commerce site **1618** to obtain the information that needs to be framed in the browser window displayed to the user.

Therefore, the input device **1600** is associated with the input device distributor by way of a input device ID such that scanning a product bar code **1606** in order to obtain information about that particular product generates one or more responses from one or more remote sites disposed on the GCN **306**. Stored in the input device **1600** is the input device ID which establishes its relationship to the input device distributor. Proprietary input device software running on the PC **302** operates to decode scanned bar code information and the input device ID received from the input device **1600** and wedge interface **1608**, and also provides a unique user ID for establishing the location of the user of the input device **1600**. The input device software also assembles message packets and works in conjunction with the on-board communication software (e.g., a browser) to automatically route the message packets across the GCN **306** such that the one or more remote sites disposed on the GCN **306** return information to be framed for presentation to the user.

Referring now to FIG. **17**, there is illustrated a conversion circuit of the wedge interface. A microcontroller **1700** provides conversion of the data from the input device **1600** and controls interfacing of the keyboard **1610** and input device **1600** with the PC **302**. The microcontroller **1700** has contained therein a memory **1702** or it can have external memory. There are provided a plurality of input device interfaces **1704** to the input device **1600**, a plurality of PC interfaces **1706** to the PC **302**, and plurality of keyboard interfaces **1708** to the keyboard **1610**. In general, the input device interfaces **1704** comprise a serial data line, a ground line, and a power line. Similarly, the keyboard interfaces **1708** comprise a serial data line, a ground line, a clock line, and a power line. The PC **302** provides a clock line, a power line, a serial data, and a ground line for input to the microcontroller **1700**. The microcontroller **1700** is operable to receive signals from the keyboard **1610** and transfer the signals to the PC **302** as keyboard signals. Operation with the keyboard **1610** is essentially a "pass-through" procedure. Data output from the keyboard **1610** is already in keyboard format, and therefore requires no conversion by the wedge interface **1608**. With respect to the input device **1600**, the serial data is not compatible with a keyboard **1610** and, therefore, it must be converted into a keyboard format in order to allow input thereof to the keyboard input of the PC **302**.

The microcontroller **1700** performs this function after decoding this bar code information, and conversion of this bar code information into an appropriate stream of data which is comprised of the bar code information and the appended URL. This appended URL will be pre-stored in the memory **1702** and is programmable at the time of manufacture. It is noted that the memory **1702** is illustrated as being contained within the microcontroller **1702** to provide a single chip solution. However, this could be external memory that is accessible by the microcontroller **1702**. Therefore, the microcontroller **1700** provides an interface between the input device **1600** and the keyboard **1610** to the PC **302** which allows the input device **1600** to receive coded information and convert it to keyboard strokes or, alternatively, to merely pass-through the keystrokes from the keyboard **1610**. Therefore, the user need not install any type of plug-in circuit board into the motherboard of the PC **302** in order to provide an interface to the input device **1600**; rather, the user need only utilize the already available keyboard port in order to input the appropriate data into the system.

In this particular disclosed embodiment, the microcontroller **1700** comprises a PIC16C73 microcontroller by Microchip Technologies™. The PIC16C73 device is a low cost CMOS8-bit microcontroller with an integrated analog-to-digital converter. The PIC16C73 device, as illustrated in the disclosed embodiment, has 192 bytes of RAM and 4k×4 of EPROM memory. The microcontroller **1700** can accommodate asynchronous or synchronous inputs from input devices connected to it. In this disclosed embodiment, communication to the keyboard **1610** is synchronous while it is asynchronous when communicating with input device **1600**.

It should be noted that, although in this particular embodiment bar code information of the bar code **1606** is input into the keyboard input port of the PC **302**, disclosed methods may also be advantageously utilized with high speed port architectures such as Universal Serial Bus ("USB") and IEEE 1394.

Bar codes are structured to be read in either direction. Timing considerations need to be addressed because of the variety of individuals scanning the bar code introduce a wide variety of scan rates. Bar codes use bars of varying widths. The presence of a black bar generates a positive pulse, and the absence of a black bar generates no pulse. Each character of a conventional bar code has associated therewith seven pulses or bars. Depending on the width of the bars, the time between pulses varies. In this disclosed embodiment, the interface circuitry **1608** performs a "running" calculation of the scan time based upon the rising edge of the pulses commencing with the leader or header information. The minimum and maximum scans times are calculated continuously in software with the interface **1608** during the scanning process to ensure a successful scan by the user.

Referring now to FIG. **18**, there is illustrated a sample message packet transmitted from the user's PC **302** to the ARS **308**. The message packet **1800** comprises a number of bits of information including the bar code information **1802** obtained from the user scanning the bar code **1606** with the input device **1600**; the input device ID **1804** which is embedded in a memory in the input device **1600** and identifies it with a particular input device distributor; and a user ID **1806** which is derived from the software running on the PC **302** and which identifies uniquely with the user location. Note that the message packet includes other necessary information for the proper transmission for point to point.

Referring now to FIG. **19**, there is illustrated a more detailed block diagram of the routing of the message packets in order to present the framed information to the user. As is mentioned hereinabove, when the user scans a bar code **1606** using the input device **1600**, a input device program running on the user PC **302** is operable to interpret the information output by the input device **1600** and generate a message packet for transmission over the GCN **306**. The input device program assembles the message packet such that it is directed to the ARS **308** disposed on the GCN **306**. The message packet contains several pieces of information including the input device ID **1804** which links it to the input device distributor, the user ID **1806** which identifies the particular user using the input device **1600**, and bar code information **1802** describing a particular product of interest to the user. This message from the PC **302** is transmitted over a path **1900** to the ARS **308** where the ARS database **310** is accessed to cross reference the ID information **1804** and bar code information **1802** to a particular advertiser and input device distributor. The ARS **308** returns a message packet over a path **1902** to the user PC **302** which contains

routing information as to the location of various other sites disposed on the GCN **306**, for example, the advertiser server **312** and input device distributor site **1616**.

It can be appreciated that other information can also be provided by the ARS **308** which more closely targets the particular user of the input device **1600**. For example, if it is known that a particular input device **1600** is sold in a certain geographic area, this information can be useful in targeting the particular user with certain advertising information relevant to that geographic area. In any case, the information returned from the ARS **308** over path **1902** provides enough information for the input device program running on the user PC **302** to identify a number of other sites disposed on the GCN **306**. The user PC **302** then processes the return message packet and routes another message packet over a path **1904** to the advertiser server **312**. The advertiser server **312** then returns product information of the particular product in which the user was interested back to the user PC **302** over a path **1906**. Similarly, the user PC **302** routes information (e.g., the URL of the input device distributor site and the user profile) to the input device distributor site **1616** over a path **1908** in order to obtain information back over a path **1910** for framing any banners which identify the input device distributor. Additionally, the user PC **302** forwards a message packet to the E-commerce site **1618** over a path **1912** in order to return information regarding any particular advertisements the input device distributor wants to display to the user. The advertisements are returned to the PC **302** over a path **1914**.

Referring now to FIG. **20**, there is illustrated a block diagram of a browser window according to the disclosed embodiment. The browser window **2000** is partitioned into a plurality of areas for framing specific information. A bar code area **2002** displays that product information in which the user was interested; an input device-specific area **2004** displays information about the input device distributor; and an E-commerce area **2006** displays advertising information that the input device distributor selects for display according to this particular user and input device **1600**. As mentioned hereinabove, a program operable to process scanned bar code information with the unique input device **1600** develops the browser window by partitioning it into specific areas for the framing of information. Therefore, information returned from the E-commerce site **1608** is passed through the GCN **306** to the particular E-commerce frame **2006**. Similarly, information about the particular product of interest is returned from the advertiser site **312** across the GCN **306** to the particular bar code specific area **2002**. Information placed in the input device specific area **2004** is information about the input device distributor which is returned from the input device distributor site **1616** across GCN **306**.

Referring now to FIG. **21**, there is illustrated a structure of information contained in the ARS database. The ARS database **310** contains a variety of information required to properly interrogate and assemble packets for obtaining information from the various sites disposed on the GCN **306**. The ARS database **310** has a database structure **2100** which contains addresses for the web sites containing the product information requested by the user when scanning the bar code **1606** with the input device **1600**. Under a PRODUCT heading **2102** are listed the particular bar codes and associated routing information for addressing the respective server location. For example, the ARS server **308** may contain any number of advertisers having unique URL addresses associated therewith. Therefore, the bar code **1606** of a particular product is associated with a unique URL address which routes any request for information of that product to that particular advertiser's site. Also part of the ARS database structure **2000** is a heading of INPUT DEVICE under which is the input device ID **1804** and the distributor associated with that input device ID **1804**.

It can be appreciated that there may be a number of distributors using the disclosed architecture such that each distributor has an ID embedded in the input device **1600** which uniquely identifies that input device with the particular distributor. Therefore, the unique input device ID **1804** needs to be listed with the respective distributors of that input device **1600** in order to process the information that needs to be framed and displayed to that particular user. Another heading under the ARS database structure **2100** is a user heading **2106** which contains profile information associated with that particular user ID **1806**. As mentioned hereinabove, the user ID **1806** is obtained via the input device software running on the PC **302** and upon installation or subsequent configuration may request that the user input certain profile information which may be used to target that particular user with products and services which identify with that user profile. The ARS database structure **2100** also contains an E-commerce heading **2108** which contains information related to the bar code **1606** and an advertisement that may be triggered by the request for that information. For example, any bar code **1606** associated with a paper source **1602** can be associated with the specific information in the ARS database **310**. A user wishing to obtain information about a specific soft drink may, in fact, trigger an advertising response of a competitor product. Similarly, the user interested in information about that particular soft drink may also trigger information which is relevant to that particular product or a product which may normally be served in conjunction with that soft drink. Furthermore, if the user profile indicates that this individual has significant interest in finance or insurance, the request for information regarding this particular bar coded product may trigger advertisement from an E-commerce server **1618** related to information about finance and insurance. It should be noted that the information described as contained within the ARS database structure **2100** is not limited to what has been described, but may comprise any number of pieces of information used to present desired information to the computer display of the user.

Referring now to FIG. **22**, there is illustrated a flowchart of the process of receiving information from the user's perspective, and according to the disclosed embodiment. The input device software running on the user's PC **302** runs in the background until activated by output from the input device **1600**. Therefore, flow moves to a decision block **2200** where if a scanned input does not occur, flow moves out the "N" path and loops back to the input of decision block **2200**. On the other hand, if scanned input information is received, flow moves out the "Y" path to a function block **2202** where the input device software assembles a message packet containing the bar code information, the input device ID **1804** and the ARS **308** URL address. Additionally, the browser is launched in which this information is placed for transmission to the ARS **308**. Flow then moves to a function block **2204** where the browser is partitioned into any number of areas in which information is displayed when obtained from the input device distributor site **1616**, the E-commerce site **1618**, and the advertiser server **312**. It should be known that although three frames are shown in the particular window **2000** of this embodiment, the number of frames displayed in the window **2000** is limited only by the available real estate of the window **2000** area itself.

After the input device software partitions the browser window into one or more frames in preparation of receipt of

return information, flow moves to a decision block **2206** where the computer waits for information to be returned from the various sites disposed on the GCN **306**. If information is not returned, flow moves out the "N" path and simply loops back to the input to continue monitoring for receipt of the information. If information has been received, flow moves out the "Y" path to a function block **2208** where routing information for each frame (or partitioned area of the window **2000**) is inserted into one or more packets for transmission to the various sites. The various sites then return the requested information back to the PC **302**, as indicated in function block **2210**. Flow is then to a function block **2212** where the proprietary software working in conjunction with the hosted browser places the returned information into the respective frames of the window. The user, viewing the display at PC **302**, then perceives a variety of information, one of which is the particular product information which he or she requested, in addition to input device distributor information, and possibly other advertisements based upon the user's profile.

Referring now to FIG. **23**, there is illustrated a flowchart of the process according to the ARS. The ARS **308** is operable to decode and process messages received from the GCN **306**. Therefore, flow is to a decision block **2300** where, if bar code information is not received, flow is out the "N" path with loop-back to its input. If bar code information has been received, flow is to a function block **2302** where a matching process occurs to link the bar-coded product information to its respective manufacturer. The ARS database **310** also associates the URL address of the manufacturer's server. When a match is found, the ARS **308** begins to assemble a message packet of information for transmission back to the PC **302**, as indicated in function block **2304**. The message packet contains the product information and the URL address of the manufacturer's website. Flow then moves to a decision block **2306** where the input device ID **1804** is compared with the list of input device IDs issued by the particular input device distributor. If the input device ID **1804** is validated, flow moves out the "Y" path to a function block **2308** where the message packet is appended with the input device ID **1804** and distributor routing address. Flow then moves to a decision block **2310** where the ARS **308** determines if any E-commerce information is to be associated with a particular input device ID **1804**. If so, flow is out the "Y" path to a function block **2312** where the message packet is appended with the E-commerce routing string. The E-commerce routing string provides addressing for the E-commerce server **1618**. Flow then moves to a function block **2314** where all message packets are returned back to the PC **302** for processing.

Referring back to decision block **2306**, if the input device ID **1804** is determined to be invalid, flow moves out the "N" path and jumps forward to the input of decision block **2314**, since the lack of a input device ID **1804** interrupts the link to any advertising provided by the E-commerce server **1618**. At this point, the only information provided is the link to the advertiser server **312** for return of product information. Referring now to decision block **2310**, if no E-commerce information is available, flow moves out the "N" path and jumps forward to the input of function block **2314** where the message packet back to the PC **302** contains only the URL of the advertiser server **312**, the bar code information, the distributor server **1616** address and input device ID **1804** information.

Referring now to FIG. **24**, there is illustrated a flowchart of the process performed at the E-commerce site. The E-commerce server **1618** receives the message packet from the user PC **302**, as indicated in function block **2400**, and decodes the packet to perform a match with the bar coded information. Moving on to a decision block **2402**, if the match is unsuccessful, flow is out the "N" path to a function block **2404** where the match is rejected. A message may be returned to indicate that a problem occurred and the user may need to re-scan the product bar code **1606**. If a successful match occurs, flow moves out the "Y" path to a function block **2406** where the input device ID **1804** is matched with the bar code product information. The bar coded information may be distributed to customers over a large geographic area. However, the input device **1606** may be coded for certain geographic areas. For example, a input device **1600** having an XXX ID may be restricted for sale in the Southwestern United States while a input device **1600** having a YYY ID may be sold only in the Northeast. In this way, geographic areas may be targeted with advertising more appealing to that particular area. Advertising returned to the user PC **302** may be focused further by obtaining a user profile when the software or input device **1600** are installed. In this way, advertising may be focused based upon the user profile. Therefore, flow moves to a function block **2408** to lookup the E-commerce action based upon the input device ID **1804** and the bar code information. Flow moves to a function block **2410** to assemble all the information into a packet for return to the user PC **302**. The product information and/or user profile information may be returned. Flow is then to a function block **2412** where the message packet is transmitted.

Referring now to FIG. **25**, there is illustrated an optical reader which can be used for scanning an optical code, for example a bar code, and delivering signals indicative of the optical code to a computer. Reader **2500** typically includes an outer shell **2502** enclosing the working components and shaped for convenient manual grasping by the user. During operation, the front end **2504** of the reader **2500** is brought into contact with (or very close proximity to) a surface **2506** bearing the optical code to be read, for example barcode **2508**. The reading operation begins with the reader **2500** positioned at a starting position (shown in phantom and denoted by reference numeral **2510**) to one side of the barcode **2508**. The reader **2500** is then moved across the barcode **2508** as indicated by arrow **2512** to a final position (shown in phantom and denoted by reference numeral **2514**) on the opposite side. Typically, the reader **2500** must be moved across the barcode **2508** at a substantially constant speed to ensure accurate reading of the symbol. Once the optical symbol has been scanned by the optical reader **2500**, internal circuitry produces electronic output signals indicative of the symbol. These electronic output signals are provided to a computer (not shown), typically by means of a wired control cord **2516**. Alternately, the output signals may be sent from the reader **2500** to the computer using other known transmission technologies, for example using a wireless radio frequency (RF) link or a wireless infrared (IR) link.

Referring now to FIGS. **26** and **27**, there are illustrated external views of optical reader **2500** according to an embodiment of the invention. Typically, the outer shell **2502** of the reader **2500** will be constructed from multiple pieces to allow simple assembly of the internal components. For example, the illustrated embodiment includes an upper shell **2702** and a lower shell **2704** which form a hollow interior cavity within which the internal components are mounted. To provide for easier gripping and to prevent the device from rolling across flat surfaces, the upper shell **2702** may have a generally semi-circular cross section and the lower shell

2704 may have a generally flat cross section. A scanning portal 2706 is provided at the front end 2504 of reader 2500 to allow the interior components to project and collect radiant energy during the scanning operation. The scanning portal 2706 is typically covered by a protective window 2708 which is transparent to the radiant energy wavelength used for scanning. Projection and/or collection lenses may be visible behind the window 2708. For example, in FIG. 27, a collection lens 2710 and a projection lens 2712 are visible through the window 2708.

To assist the user in maintaining the proper orientation of the reader 2500 during the scanning operation (i.e., with the front end 2504 substantially flat against the surface 2506 bearing the optical symbol, the front end 2504 may be adapted to form a substantially flat bearing surface 2602 surrounding the scanning portal 2708. The bearing surface 2602 is preferably substantially perpendicular to the axis 2604 of the collection portion of the optical system. To reduce the likelihood that the scanning window 2708 will be scratched during the scanning process, it may be inset slightly behind the plane of the bearing surface 2602. The window 2708 may be further protected by the provision of pads 2606 on external shell 2502 which project slightly ahead of the bearing surface 2602.

The external shell 2502 of the reader 2500 may be contoured to provide a comfortable grasp for the user and/or to have an attractive or distinctive shape. For example, the upper shell 2702 of the reader 2500 is smoothly contoured to provide a "streamlined" appearance in accordance with a common style used on other computer related devices such as a computer mouse, a track ball, etc. In other embodiments, however, the exterior shell may be contoured to provide a more distinctive appearance. The exterior surface of the outer shell 2502 further provides an area 2607 for the placement of identifying or advertising indicia 2608 (shown in phantom). Such indicia, if present, may be formed by printing or painting directly on the exterior surface of the reader 2500, by the application of discrete labels, and/or by molding letters, designs or other indicia directly into the surface of the reader by means of injection molding or a similar process.

Referring now to FIGS. 33–35, there is illustrated an alternative embodiment of the invention. Optical reader 3300 has an exterior shell 3302 contoured to resemble an animal, in this case, a stylized cat. It will be readily appreciated that, except for the recontoured shell 3302, the features described for the previous embodiment are present in substantially identical form in this embodiment, including the scanning portal 2706, window 2708, bearing surface 2602 and pads 2606. In addition, identifying or advertising indicia 2608 may be placed on the stylized shell of reader 3300 in the same fashion as on the previous embodiment. It will further be apparent that the external shell of the reader can be contoured to resemble other animals, e.g., dogs, birds, reptiles, fish, etc. or other objects including automobiles, trucks, trains, aircraft, etc. without departing from the scope of the current invention.

Referring now to FIG. 28, there is illustrated a general block diagram showing the function of an optical reader in accordance with embodiments of the current invention. A radiant energy source 2802 is provided for generating a radiant energy which will be used for illuminating a target region containing the barcode or other symbol to be scanned. The radiant energy, denoted by arrow 2804, is transmitted from the source 2802 into an optical system 2806. The radiant energy is typically light in the visible wavelength, however light of infrared (IR) wavelength or other forms of radiant energy may be used. The optical system 2606, which will be described in further detail below, directs the radiant energy (now denoted by arrow 2807) into a target region 2808 adjacent to the reader. The radiant energy directed into the target region 2808 illuminates a barcode 2810 present therein and causes an image, denoted by arrow 2812, of the barcode to be reflected back into another portion of the optical system 2806. The reflected image of the barcode passes through the optical system 2806 where it is processed to increase its contrast and decrease its luminance. After processing, the image, denoted now by arrow 2814, is directed by the optical system 2806 onto a photodetector 2816, which produces output electrical signals indicative of the radiant energy incident thereon. The output electrical signals, denoted by arrow 2818, are routed to a decoder circuit 2820, which utilizes electronic circuitry to decode the output electrical signals to provide an indication of the information contained in the barcode 2810. The information, denoted by reference numeral 2822, is then transmitted to an external computer 2824 for further use or processing.

Typically, the decoded information 2822 is transmitted to the external computer 2824 in accordance with a known data interface format. Suitable data interface formats for transmission of the barcode information from the decoder circuit 2820 of the reader to an external computer 2824 include an output signal which emulates computer keyboard keystrokes such as those in accordance with the PS/2 keyboard interface standard or the AT keyboard interface standard. Alternately, the output signals may be formatted in accordance with other known data interface or communication standards, including the Universal Serial Bus (USB) standard, the RS-232 standard, the RS-423 standard, the IEEE 1394 (FIREWIRE) standard, the Integrated Drive Electronics (IDE) interface standard, the Enhanced Integrated Drive Electronics (EIDE) interface standard, the Asynchronous Transfer Mode (ATM) transmission standard, the Fiber Distributed Data Interface (FDDI) interface standard, the 8-Bit Industry Standard Architecture (ISA) bus standard, the 16-bit Industry Standard Architecture (ISA) bus standard, the VL-Bus bus standard, the Peripheral Component Interconnect (PCI) bus standard, the Personal Computer Memory Card International Association (PCMCIA) bus standard, the Centronics Parallel Port (CPP) standard, the Enhanced Parallel Port (EPP) standard, the Extended Capabilities Port (ECP) standard, the Small Computer System Interface (SCSI) interface standard, and network architecture standards including Ethernet and Token Ring network standards.

It is desirable to provide an optical reader which is economical to produce, therefore reducing the number of components and simplifying the design and construction of the remaining components are important features of the current invention. Referring now to FIG. 29, there is illustrated the optical reader 2500 with the upper shell removed to show the interior components. A printed circuit board (PCB) 2902 is provided for physical mounting and electrical interconnection of the necessary electronic components comprising the decoder circuit and output signal interface circuit. These components include a microprocessor 2904, memory (not shown), interface circuit 2906, timing crystal 2908 and signal amplifiers 2910. Note that for clarity of illustration, the individual circuit lines and many smaller components such as resistors which appear on the actual PCB 2902 are not illustrated in FIG. 29. The PCB 2902 may be mounted to the lower shell 2704 of the reader by means of locating pins 2912 molded into the shell and protruding through corresponding holes in the PCB. These holes can further receive screws (not shown) for securing the upper

shell **2702** to the lower shell **2704** during final assembly. The portion of the PCB **2902** mounting amplifiers **2910** is preferably enclosed is shielding material **2914** to prevent stray electrical signals from creating noise in the amplifier circuitry. The control cord **2516** connects the reader **2500** to the external computer **2824**, entering the shell and passing through strain relief fitting **2916** for connecting to the PCB **2902** with electrical connector **2918**.

The optical system **2806** may be mounted to the front end of the PCB **2902** and further secured to the lower shell **2704** with locating pins **2920** and/or clips **2922** as needed. The radiant energy source **2802** is typically mounted to the PCB **2902** and electrically connected thereto to receive electrical power. The radiant energy source **2802** produces light or other radiant energy which is delivered into the optical system **2806**. In one embodiment, the radiant energy source **2802** is a light emitting diode (LED), however it will be apparent that a laser or other radiant energy source could be used. The optical system **2806** comprises a projection portion **2924** for directing the radiant energy along a projection path extending from the radiant energy source **2802** to the target region **2926**. The optical system **2806** further includes a collection portion **2928** for collecting the radiant energy reflected from a symbol (e.g., a barcode) when the symbol occupies the target region **2926** and directing the collected radiant energy along a collection path extending from the target region to the photodetector **2816**. The collection path of the optical system **2608** is typically enclosed by a light shield **2930** to prevent unwanted radiant energy from entering the optical system and being reflected or scattered into the photodetector **2816**.

Referring now to FIG. **30**, there is illustrated an enlarged view of the optical system **2608** showing its constituent components. In FIG. **30**, the top of the light shield **2930** has been removed for clarity of illustration, but the walls **3002** of the light shield are present on either side of the collection axis **2604**. In this embodiment, the radiant energy source **2802** is mounted on a forward extension **3004** of the PCB **2902**. At least a portion of the radiant energy emitted by the source **2802**, which is typically visible—or IR—wavelength light, enters the projection portion **2924** of the optical system. In the embodiment shown, the projection portion includes a guideway **3006** which directs the radiant energy (denoted by rays **3008**) from the source **2802** to the target region **2926**. In one embodiment, the guideway **3006** comprises a transparent prism which directs the radiant energy **3008** by reflection from the guideway sides **3010** and by refraction at the guideway ends **3012**, **3013**. It will be apparent, however that other embodiments may utilize a mirror or fiber optics as the guideway **3006**. Alternatively, other embodiments may directly illuminate the target region **2926** from the source **2802** without the use of a guideway. A guideway lens **2712** may be used at the upstream end **3013** of the guideway **3006** to increase the amount of radiant energy collected from the source **2802** for delivery to the target region **2926**.

The radiant energy **3008** delivered to the target region **2926** illuminates any barcode **2508** present, causing the energy to be scattered from the surface of the barcode as illustrated. At least a portion of the energy scattered from the barcode **2508** is reflected into the collection lens **2710**, forming a reflected image of the barcode. This image is directed along the collection axis **2604** of the optical system downstream toward the photodetector **2816**. As the barcode **2508** moves through the target region **2926**, the reflected image of the alternating light and dark (i.e., more reflective and less reflective) bars forming the symbol will be directed across the photodetector **2816**, causing the output electrical signals to vary correspondingly. Given output electronic signals having sufficient signal-to-noise ratio, decoding circuits of known design can amplify and decode the output electrical signals from a photodetector and identify the corresponding barcode. However, prior to the current invention, photodetectors providing signals having sufficient signal-to-noise ratio were not available at a sufficiently low manufacturing cost. Of particular challenge is obtaining a high signal-to-noise ratio electrical signal from a photodetector without utilizing a multi-stage photo amplifier. Further, it is preferred that the system utilize as few optical elements as possible.

Referring still to FIG. **30**, the photodetector **2816** of the current embodiment is mounted on the top surface **3014** of a base **3016** and electrically connected to the PCB **2902** with leads **3018**. The photodetector **2816** may be a device selected from the group of known light-sensitive devices including photo-diodes, photo-transistors, photo-resistors, photomultiplier tubes, and Charge Coupled Devices (CCD). Alternately, the photodetector **2816** may be another type of device for producing electrical signals corresponding to light incident thereupon. In a preferred embodiment, the photodetector **2816** is a photo-diode which provides a desirable combination of light-sensitivity and low cost.

Disposed upstream on the collection path from the photodetector **2816** is a pinhole aperture **3020**. Preferably, there are no intervening or refractive or diffractive elements between the pinhole aperture **3020** and the photodetector **2816**, as their presence will increase the cost of the device. A pinhole aperture is a well known optical element which provides a well defined, virtually undistorted image of objects across a wide angular field (i.e., good depth of focus) and over a large range of distances (i.e., good depth of field). A pinhole aperture does not focus the energy passing therethrough, but rather increases the contrast of the image, although at the same time decreasing its luminance. Raising the contrast of the image passed to the photodetector **2816** increases the signal-to-noise ratio of the resulting electrical output. The lower luminance of the image merely reduces the overall output signal strength and can be easily overcome by electronic amplification if the signal-to-noise ratio of the signal is high. Thus, by positioning the pinhole aperture **3020** upstream of the photodetector **2816** in the current invention, the image contrast of the barcode image is increased such that an inexpensive single stage photodetector can provide an electrical signal having sufficient signal-to-noise ratio to allow decoding of the barcode without encountering excessive signal noise during electronic amplification.

The collection lens **2710** is disposed upstream on the collection path (i.e., toward the barcode which is the source of the image) from the pinhole aperture **3020**. Preferably, collection lens **2710** is a magnifying lens, i.e., refracting the light rays passing therethrough to create an image which has increased dimensions compared to the actual bar code. The magnifying lens illustrated in FIG. **30** is a single element double convex lens. In another embodiment, a single element plano-convex lens may be used. In still further embodiments, other single element or multi element magnifying lenses can be used for collection lens **2710**. Preferably, there are no intervening refractive or diffractive elements between the pinhole aperture **3020** and the collection lens **2710**, as their presence will increase the cost of the device.

The refracted light rays **3009** leaving the collection lens **2710** form an image of the bar code which is dimensionally

magnified as it moves toward the pinhole aperture **3020**, thereby increasing the apparent width of the bars when their image is received at the pinhole aperture. The portion of the image passing through the pinhole aperture **3020** and reaching the photodetector **2816** will likewise be dimensionally magnified. Thus, the optical system **2806** of the current embodiment, combining dimensional image magnification (provided by the collection lens **2710**) and contrast enhancement (provided by the pinhole aperture **3020**) effectively acts to pre-amplify the optical signal reaching the photodetector **2816** such that the electrical output signals **2818** will have sufficient signal-to-noise ratio for amplification and decoding without requiring a multi stage electronic photo amplifier which would be more expensive to manufacture. Described another way, the optical system according to one embodiment of the current invention provides increased resolution (i.e., the ability to distinguish between two lines or points in a symbol) as follows: The bar code **2508** to be read has a minimum unit width denoted by W, for example, the minimum width of a bar in the bar code. The light rays **3009** of the image are refracted by the collection lens **2710** such that the minimum unit width of the bar code is dimensionally magnified, for example, from W to 2×W (i.e., a factor of 2×) as it moves from the target plane **2506** to the pinhole aperture plane **3024**. The pinhole aperture **3020** is selected to have a diameter, for example 0.5×W, which is smaller than the magnified minimum unit width. Thus, only a sample (denoted by reference numeral **3028**) of the image rays may pass through the aperture **3020** to the photodetector **2816** lying in the photodetector plane **3026**. This results in the photodetector **2816** seeing (i.e., having in its field of view), at most, either a portion of a single feature (bar or space) or portions of one bar and one adjacent space. The photodetector never sees portions of three adjacent features at the same time. This arrangement results in a very high signal-to-noise ratio being produced by the photodetector **2816**. In one embodiment of the current invention, the optical system **2806** provides at the photodetector plane **3026** an image of the symbol **2508** at the target plane **2506** which is dimensionally magnified within the range of about 0.5× to about 5×. In another embodiment, the optical system **2806** provides at the photodetector plane an image of the symbol at the target plane which is magnified within the range of about 1.5× to about 2.5×. In yet another embodiment, the optical system **2806** provides at the photodetector plane an image of the symbol at the target plane which is dimensionally magnified within the range of 1.9× to about 2.1×.

Referring still to FIG. **30**, a protective window **2708** may be provided along the collection path upstream from the magnifying lens **2710**. The protective window **2708** has parallel surfaces which are disposed substantially perpendicular to the collection path **2604** and thus do not substantially refract or diffract light rays passing therethrough. In the embodiment illustrated, the protective window **2708** is molded as an integral portion of the component which also comprises the projection guideway **3006** and guideway lens **2712**. In one embodiment of the current invention, the collection portion **2928** of the optical system **2806** consists of only the protective window **2708**, the magnifying collection lens **2710** and the pinhole aperture **3020** arranged in that order between the target symbol **2508** and the photodetector **2816**. Such an embodiment provides a functional optical system having very low production costs.

Referring now to FIGS. **31** and **32**, there is illustrated a discrete detector unit **3102** which may be used in an embodiment of the invention. The detector unit **3102** comprises the photodetector **2816** and the pinhole aperture **3020** packaged together in a discrete unit. Such packaging decreases production costs by reducing the assembly's part count and by reducing the number of components which must be assembled.

As best seen in FIG. **32**, the detector unit **3102** includes a base **3016** having a top surface **3014** upon which the actual photodetector **2816** is mounted. Note that the photodetector **2816** may be a separate electronic component which has been mounted to the base **3016** or alternately, it may be a device formed as an integral part of the base substrate. A cap **3104** is mounted to the base **3016**. The cap **3104** has a top portion **3106** which is spaced apart from the top surface **3014** of the base **3016** to define an interior cavity **3202** containing the photodetector **2816**. The cap **3104** has a single pinhole **3020** formed therethrough at a predetermined distance **3108** from the photodetector **2816**. Except for the pinhole aperture **3020**, the cap **3104** is preferably light-tight. In one embodiment of the invention, the cap **3014** of the detector unit **3102** is a cylindrical metallic canister having a flat upper portion **3106**. Using a metallic canister for the cap **3014** has two advantages: first, it provides a rugged container which protects the photodetector from damage during transportation, handling and assembly; and second, the metallic material allows a pinhole aperture **3020** having high dimensional accuracy to be formed by drilling, punching or otherwise machining a hole through the metallic surface. In addition, cylindrical metallic canisters suitable for use as cap **3014** are readily available at very low costs in the electronic industry, having been used for many years as protective caps for transistors and other semiconductor devices. To provide for a convenient sized optical reader, one embodiment of the current invention utilizes a detector unit **3102** having a cap **3104** with a diameter **3204** within the range of about 3 millimeters to about 20 millimeters. Another embodiment of the current invention utilizes a detector unit **3102** having a cap **3104** with a diameter **3204** within the range of about 4 millimeters to about 8 millimeters. Yet another reader according to the current invention utilizes a cap for the detector unit **3102** having a diameter **3204** within the range of about 5.5 millimeters to about 6.5 millimeters.

The predetermined distance **3108** between the pinhole aperture plane **3024** and the photodetector plane **3026** will affect the overall magnification of the image (or portion of the image) received at the photodetector **2816**. In one embodiment of the current invention, the predetermined distance **3108** is within the range of about 1 millimeter to about 10 millimeters. In another embodiment of the current invention, the predetermined distance **3108** is within the range of about 3 millimeters to about 7 millimeters. In yet another embodiment, the predetermined distance **3108** between the photodetector **2816** and the pinhole aperture **3020** is within the range of about 4.5 millimeters to about 6 millimeters.

Referring now to FIG. **36**, there is illustrated a flowchart of a method of reading a bar code in accordance with another aspect of the current invention. The method starts in block **3602** and proceeds to the first function block **3604** wherein the target region is illuminated with a radiant energy generated by a radiant energy source which is directed from the source to the target region. Next, flow continues to function block **3606** wherein the bar code or other symbol is moved through the target area. Flow next proceeds to block **3608** which represents transmitting an image of the illuminated bar code through an optical system along a collection path extending from the target region to a photodetector. The step of transmitting includes a first sub-step **3610** wherein the

reflected image of the bar code is dimensionally magnified with an optical element which is disposed along the collection path between the target region and the photodetector. Preferably, the optical element used for dimensional magnification is a magnifying lens, either a double convex lens or a plano-convex lens. Further, it should be noted that sub-step **3610** is preferred but not required.

The step **3608** of transmitting an image of the illuminated bar code further comprises a second sub-step **3612** which is increasing the contrast of the reflected image and decreasing the luminance of the image by passing it through an optical element disposed along the collection path between the target region and the photodetector. Note that when sub-step **3610** is performed, the optical element for magnifying the image is disposed between the bar code and the optical element which increases the contrast of the reflected image. In an embodiment of the invention, the optical element which increases the contrast of the reflected image is a passive device, i.e., it requires no electrical energy or other external power. In another embodiment, the optical element which increases the contrast of the image is combined in a discrete package with the photodetector. In yet embodiment, the optical element which increases the contrast of the reflected image is a pinhole aperture. The pinhole aperture may be formed through the body of a discrete package enclosing the photodetector or the pinhole aperture may be a separate element included in the optical system.

Flow now continues to function block **3614** wherein the reflected image of the bar code is received by the photodetector. Flow then continues to function block **3616** wherein the photodetector generates output electrical signals indicative of the radiant energy received. Flow then proceeds to function block **3618** wherein the output electrical signals produced by the detector are decoded to provide an indication of the information contained in the bar code. The method of reading the bar code is now complete as indicated by the flow proceeding to the "End" block **3620**.

Referring now to FIG. **37***a,* there is illustrated a bar code **3702** which can be scanned with the input device **1600**, for example the optical reader **2500** or **3300** previously described, to extract the information contained therein. Typically, these bar codes are associated with a product or a service and they will have the decoded information disposed thereunder in the form of numbers, this represented by a series of "xxx's." These bar codes are conventional and can be generated with many types of programs. However, they are usually uniquely associated with a given product or product number (i.e., a "UPN") or they can be generated for any type of application a user desires them for. However, with a UPN, they have specific links and specific fields. For example, a certain portion of the bar code **3702**, when associated with a product having a UPN, will define the company. Therefore, all UPNs for a given company will have this set portion and it will always be the same.

The bar code **3702** is disposed on a surface, either the surface of a product or even an advertisement or a tag associated with the product. It is typically in close association with that product or service. On the surface in proximity thereto is provided a logo **3704**. This logo is an indicia of the fact that the bar code **3702** is associated with the system described hereinabove, i.e., when this bar code **3702** is scanned with the PC **302** running the appropriate software, this indicates that information is in the database of the ARS **308**. Of course, the user does not know that this information must first be obtained from ARS **308**; rather, the user merely knows that the indicia **3704** indicates that scanning of the bar code **3702** will launch a computer to a destination site. This is unique in that the bar code performs two functions, a retail function and a routing function. However, the user, when selecting products, will have no idea that this bar code **3702** on the product can actually allow them to have access to a defined location on the network without the indicia **3704**.

Referring now to FIG. **37***b,* there is illustrated an alternate embodiment, wherein the bar code **3702** is surrounded by a border **3706**, which border **3706** can be a particular color that can stand out. Typically, this bar code **3702** will be disposed on a product on a retail shelf. When the consumer picks up the product, the consumer can actually determine which products have a product code for use by the retailer that is also useful to access some location on the network. For example, a manufacturer may want to offer some type of prize or incentive for an individual to purchase their product. They could actually offer some type of coupon from the remote location, provided that a consumer purchases their product and then scans it with the input device **1600** attached to the PC. If this occurs, then the user will be connected to the location and receive some type of coupon. However, in order for this to occur, the user must recognize that the product they are purchasing was one that had a UPN associated therewith that was "network compatible." This network compatibility indicates to the consumer that they can in fact access some location over the network. They are not informed as to what location can be located; rather, only that some type of particular location can be located. This provides a means by which the manufacturer can possibly sell more product and various types of coupons that can be uploaded.

Referring now to FIG. **38***a,* there is illustrated a diagrammatic view of a unique ornamental bar code **3802**. The bar code **3802** is an ornamental bar code that provides a unique appearance for a user which essentially identifies the bar code as being associated with a particular function, that function being to facilitate interconnection with a remote location on a network, i.e., the Internet and the hereinabove described application.

The ornamental bar code illustrated in FIG. **38***a* has a plurality of slanted lines of differing thicknesses, with a left side border **3804**, and a right side border **3806**. The left side border **3804** has a straight slanted edge **3808** and the right side border **3806** has a slanted straight line edge **3810**. The edges **3808** and **3810** are parallel to each other and they are at the same angle. Disposed therebetween are a plurality of varying width straight lines. These lines are the encoded information which is represented by a plurality of "X's" disposed at the lower edge of the bar code **3802**. It is noted that the straight lines are similar, if not identical, to those provided on a conventional bar code. The organization and spacing of the lines is also conventional and the illustration of FIG. **38***a* is not meant to be to scale. However, although this is an ornamental bar code, it is a bar code that can be scanned with the conventional scanner along different scan axis. Typically, the conventional scanner scans along a straight line. Therefore, any straight line that intersect with the bar code at substantially any angle must be able to determine along that line the differing widths. Therefore, if the adjacent lines were not substantially parallel to each other along the scan line, such that the width thereof might change, this may cause an error in the reading. Typically a bar code is scanned along many different angles to determine which angle gives the best reading. Although it is not required to have the borders **3804** and **3806**, these are provided for an ornamental purpose. Any arrangement of the lines other than the conventional, will provide an ornamental appearance. Further, it could be that the lines have different colors.

Referring now to FIG. **38***b*, there is illustrated an alternate design for the ornamental bar code **3802**, this being an ornamental bar code **3814**. This ornamental bar code **3814**, similar to the bar code **3802**, has a left border **3816** and a right border **3818**. However, the border **3816** has disposed thereon a serpentine edge **3820** and the border **3818** has a substantially similar shaped serpentine edge **3822** disposed thereon. Between the two serpentine edges **3820** and **3822** are disposed a plurality of varying width lines, each being serpentine such that the edges thereof are substantially identical to the edges **3822**, wherein the space therebetween is of uniform thickness, although it is serpentine in shape. Further, the edge of the bar code **3814** or **3802** need not be straight but, rather, can be uniquely shaped. Again, the spaces between the lines need to be of such a nature that a straight line scan will be able to discriminate between varying widths and open spaces to extract the code therefrom.

Referring now to FIG. **39**, there is illustrated a product **3902** such as a can with the bar code **3802** disposed thereon. This bar code **3802**, as described hereinabove, has a unique design which can be recognized as being associated with a particular function, the function in the disclosed embodiment being that of allowing interconnection to the web. However, bar code **3802** is coded with information that is unique to the product and is not necessarily unique to any web address; rather, the ARS **308** has associated therewith the information to effect a communication link between a user's computer at which the product code **3802** is scanned and a remote location on the web, as described hereinabove. It is the recognition that this code is of such a nature that the user can access a remote web site utilizing some type of scanning input device such as that described hereinabove. This code has information contained therein, which is typically not of interest to a consumer. However, this code could be of interest to a retailer in one operation, i.e., that of maintaining inventory and setting prices, and also useful in interconnecting with a remote location on the web for conducting some type of E-commerce associated with that particular product **3902**.

In operation, as described hereinabove, the user or consumer will recognize that a particular product has a unique bar code disposed thereon. This is due to the fact that the bar code has some aesthetically attractive feature that will visually attract the user to the bar code. Once the user recognizes this, then the user is provided with knowledge that a link exists through their computer. There is a "branding" associated with this unique design, such that it will have a significant level of trade dress attributes. Once this is recognized by a consumer as the unique design associated with unique software of a service provider providing the linking operation and that it will be a "linkable" product via the bar code. Once this is recognized, the user can then utilize the computer with that software disposed thereon to create a link to the remote location.

Referring now to FIG. **40**, there is illustrated a unique bar code which can be used for encoding machine-readable information. Such bar code can be read using an input device **1600**, for example, the optical reader **2500** or **3300** previously described, to extract the information encoded therein. The bar code **4000** comprises a character string **4002** including a plurality of characters **4003**–**4008** disposed side-by-side along a longitudinal code axis **4010**. Each character **4003**–**4008** is formed by a sequence of code bars **4012** and intervening code spaces **4014**. The code bars **4012** are parallel to one another and to a line defining a bar axis **4016** which intersects the longitudinal code axis **4010**.

The bar axis **4016** forms a slant angle (denoted by reference numeral **4024**) with a line **4026** which is perpendicular to the longitudinal code axis **4010**. The slant angle **4024** has a value greater than one degree to provide a visual cue indicating the unique bar code of the current invention is being used. In another embodiment, the slant angle **4024** has a value within the range from about five degrees to about forty-five degrees. This range provides, at the lower end, an unambiguous visual cue even if angular printing variations on the order of several degrees are present, while at the same time avoiding extreme code bar length-to-height ratios (i.e., greater than 1.0) at the higher end of the range which may greatly increase the likelihood of scanning problems. In yet another embodiment, the slant angle **4024** has a value within the range from about twenty degrees to about twenty-five degrees. This range is believed to provide a strong visual cue while maintaining a code bar length-to-height ratio in the desirable range below about 0.5. In one preferred embodiment, the slant angle **4024** is about 22.5 degrees.

Each character **4003**–**4008** of bar code **4000** is defined in accordance with the character specification of a predefined bar code standard. The definition for each character includes a bar/space pattern, at least one encoded alphanumeric value and an integer checksum value. One example of such a predefined bar code standard is the Code 128 bar code, the character specification of which is shown in TABLE 1 (appended to this disclosure following the Detailed Description). The bar/space pattern of the character specification (see TABLE 1) provides the width of each successive code bar **4012** and code space **4014** for a character in terms of multiples of a minimum unit width. By way of background, each character encoded in a Code 128 bar code is made up of three code bars **4012** and three code spaces **4014**. The only exception is the stop character **4008**, which includes one extra bar **4012**. Each of the code bars **4012** and code spaces **4014** has a width **4018** which is one of four different unit widths, i.e., one, two, three or four times a minimum unit width. In the Code 128 standard, each character except the stop character has an overall width **4020** which is eleven times the minimum unit width. The stop character **4008** has an overall width which is thirteen times the minimum unit width.

The character specification also provides at least one encoded alphanumeric value for each character. In the character specification for the Code 128 standard (see TABLE 1), three alternative encoded alphanumeric values are provided for each character, namely, the Code Set A values, the Code Set B values and the Code Set C values. For example, in FIG. **40** the leftmost character (i.e., designated **4003**), which has a bar/space pattern of "112232", has an encoded alphanumeric value of"," in Code Set A, an encoded alphanumeric value of"," in Code Set B, and an encoded alphanumeric value of "12" in Code Set C. Similarly, the next character (i.e., designated **4004**), which has a bar/space pattern of "131123", has an encoded alphanumeric value of "B" in Code Set A, an encoded alphanumeric value of "B" in Code Set B, and an encoded alphanumeric value of "34" in Code Set C.

The character specification further provides an integer checksum value (shown as "Value" in TABLE 1) for each character. For the illustrated character designated **4003** having a bar/space pattern of "112232", the integer checksum value is "12", and for the illustrated character designated **4004** having a bar/space pattern of "131123", the integer checksum value is "34".

It will be appreciated that while the unique bar code illustrated in FIG. **40** utilizes characters defined in accor-

dance with the character specification of the Code 128 standard, other unique bar codes according to the current invention may utilize characters defined in accordance with the character specification of other predefined bar codes, including Codabar, the EAN 8 and 13 series, the ISBN series, the ISSN series, ITF, the JAN 8 and 13 series, Pharmacode, the UPC-A and -E series, Plessy and Code 39, or to standards yet to be developed. It will be further appreciated that while it may utilize characters defined according to the character specification of an existing bar code standard, the unique bar code of the current invention varies from the standards of known bar codes in other respects. For example, while the embodiment of bar code **4000** illustrated in FIG. **40** utilizes characters defined according to the character specification of the Code 128 standard, it does not utilize all characters of the Code 128 standard. For example, the Code 128 characters having checksum values **103**, **104** or **105** (i.e., bar/space patterns of"211412", "211214" and "211232", respectively), one of which characters is always required in a bar code according to the Code 128 standard, are never used in the bar code **4000** of the current embodiment.

Referring again to FIG. **40**, the plurality of characters in the character string **4002** of unique bar code **4000** includes, sequentially, one start character (in this case, character **4003**), a message string **4022** having at least one message character (in this case, characters **4004**–**4006**), one check character (in this case character **4007**) and a stop character (in this case, character **4008**). The unique bar code **4000** can be read by scanning in either direction along the longitudinal code axis **4010**. The stop character **4008** may therefore appear at either end of the character string **4002**. The stop character **4008** is always recognizable, however, due to its unique bar/space pattern, e.g., "2331112" in the Code 128 system. The start character **4003** is thus always the one of the two end characters on the character string **4002** which is not the stop code **4008**.

In the unique bar code of the current invention, the start character **4003** is used to designate the type identification ("TID") of the bar code. In the current invention, the start character **4003** may be any character having a checksum value within the range from 1 to 94, inclusive, thus the unique bar code **4000** may have any of 94 different TID's. In the bar code illustrated in FIG. **40**, the start character **4003** has a checksum value of "12" under the character specification for Code 128. By contrast, the standard for Code 128 bar codes requires the start character to have a checksum value within the range from 103 to 105, inclusive. Thus, the illustrated bar code **4000** is not decodable using the Code 128 bar code standard and cannot be mistaken for a Code 128 bar code, even though many of the same characters are used.

The message characters **4004**, **4005** and **4006** of the message string **4022** encode the message, i.e., the informational content, of the bar code **4000**. The message characters may be encoded in accordance with the encoded alphanumeric values of the character specification being used. However, the checksum values for each of the message characters in the unique bar code of the current invention must be within the range from 0 to 95, inclusive. Thus, using the Code Set C values for the character specification of Code 128 (see TABLE 1), the message characters **4004**–**4006** of message string **4022** encode the information "34", "56" and "78", respectively. It will be appreciated that using an alternate code set, e.g., Code Set B, the same message characters will encode the information "B", "X" and "n", respectively.

The check character **4007** is disposed between the message string **4022** and the stop character **4008**. The check character **4007** is typically used by an optical reader to ensure that the start character **4003** and the message string **4022** have been accurately read. In the unique bar code of the current invention, the check character **4007** encodes a modulus **103** checksum that is calculated by summing the checksum value of the start character **4003** plus the product of each message character position (the message character position adjacent the start character being=1) and the checksum value of the message character at that position. This sum is divided by 103. The remainder of the answer is the checksum value of the check character, which can then be determined by consulting the character specification, e.g., TABLE 1. Each encoded character in the character string **4002** is included in the checksum calculation except the stop character **4008** and the check character **4007**. Examples of the checksum calculation for the bar code of FIG. **40**, and for a second bar code (not illustrated) are provided below.

EXAMPLE 1

Calculate checksum for bar code according to current invention using Code Set C values for character specification of Code 128, for Start Character=12 and Message String=34 56 78:

| | | | | |
|---|---|---|---|---|
| Alpha. Encoded value | 12 | 34 | 56 | 78 |
| Checksum value | 12 | 34 | 56 | 78 |
| Position | Start | 1 | 2 | 3 |

Calculate Sum: 12+(1×34)+(2×56)+(3×78)=392

Calculate Modulus 103 Remainder: 392 /103=3 remainder 83

Check character=Character with checksum value 83

Final character string: 12 34 56 78 83 (Stop)

EXAMPLE 2

Calculate checksum for bar code according to current invention using Code Set B values for character specification of Code 128, for Start Character=C and Message String=o d e:

| | | | | |
|---|---|---|---|---|
| Alpha. Encoded value | C | o | d | e |
| Checksum value | 35 | 79 | 68 | 69 |
| Position | Start | 1 | 2 | 3 |

Calculate Sum: 35+(1×79)+(2×68)+(3×69)=457

Calculate Modulus 103 Remainder: 457/103=4 remainder 45

Check character=Character with checksum value 45, i.e., M

Final character string: C o d e M (Stop)

To ensure accurate reading of the character string **4002** by optical readers, the bar code **4000** includes a white space, or quiet zone **4028** disposed along the longitudinal code axis **4010** on either end of the character string. The quiet zone **4028** has a width **4029**, measured parallel to the longitudinal code axis **4010**, of at least ten times the minimum unit width of the code bars **4012**. No code bars or other symbols may be present in the quiet zone **4028**.

The unique bar code of the current invention may further include a wedge symbol **4030** disposed adjacent to the

character string **4002** to provide the appearance of a rectangular end to the slanted character string. The wedge symbol **4030** has no encoded information which can be extracted by the optical reader, and is therefore referred to as being "non-encoded". Each wedge symbol **4030** is a right triangle having a first side **4032** which is substantially parallel to the longitudinal code axis **4010**, a second side **4034** which is substantially perpendicular to the longitudinal code axis and a hypotenuse side **4036** which is substantially parallel with the bar axis **4016** of the code bars. Each wedge symbol **4030** is disposed along the longitudinal code axis **4010** such that the hypotenuse side **4036** faces the character string **4002** and is separated from the character string by a space having a width of at least ten times the minimum unit width. In other words, the wedge symbol **4030** must be located outside the quiet zone **4028**. In a preferred embodiment, the bar code **4000** includes a pair of wedge symbols **4030**, with one wedge symbol disposed on either side of the character string **4002** to provide an overall rectangular appearance to the bar code. To further enhance the rectangular appearance, in one embodiment the wedge symbols **4030** have a height **4038**, measured perpendicular to the longitudinal code axis **4010**, which is the same as the height of the code bars **4012**.

Referring still to FIG. **40**, the unique bar code **4000** may further include a human-readable element **4040** disposed proximate to the character string **4002**. The human-readable element **4040** provides some of the information encoded in the character string **4002** in a human-readable form. Typically, the human readable element **4040** will comprise conventional alphanumeric characters arrayed in a string parallel to the longitudinal code axis **4010**. The human-readable element **4040** may be positioned above or below the character string **4002**, or it may be positioned in a recessed area formed along one edge of the character string, as illustrated in FIG. **40**.

In one embodiment, the human-readable element **4040** comprises two sub-elements. The first sub-element is an initial letter (denoted by reference numeral **4042**) disposed at the leftmost position of the human-readable element **4040**. The second sub-element is at least two two-digit strings arrayed sequentially immediately to the right of the initial letter **4042**. The first of these two-digit strings (denoted by reference numeral **4043**) provides the encoded alphanumeric value of the start character **4003**. The subsequent two-digit strings (denoted by reference numerals **4044**, **4045** and **4046**) correspond to the encoded alphanumeric values of the message characters in the message string **4022**, in sequence from the message character (i.e., **4004**) adjacent the start character **4003** to the message character (i.e., **4006**) adjacent to the checksum character **4007**. For example, in the bar code **4000** illustrated in FIG. **40**, the human-readable element **4040** includes an initial letter **4042**, which is a "C", followed by four two-digit strings **4043–4046**. The first two-digit string **4043** provides the human-readable string "12" corresponding to the encoded alphanumeric value of the start character **4003**. The subsequent three two-digit strings **4044**, **4045** and **4046** provide the human-readable strings "34", "56" and "78", corresponding respectively to the encoded alphanumeric values for the message string characters **4004**, **4005** and **4006**. To further enhance the readability of the human-readable element **4040**, blank spaces **4048** may be inserted between the initial letter **4042** and the first two-digit string **4043** and further between each pair of two-digit strings.

While automatic optical readers (i.e., those which can scan a bar code while stationary) have become commonplace in retail and commercial settings, these automated devices are typically too expensive for wide ownership by individuals such as home computer users. In contrast, manual optical readers (i.e., those which must be moved across the bar code during scanning) such as optical reader **2500** or **3300**, can be attractively priced to achieve widespread ownership among the public. Manual optical readers, however, require the user to follow certain scanning procedures in order to read reliably. For example, the scan must encompass the entire bar code in a single pass; scanning only a portion of the code will result in a read error. Further, the scan must be performed at a relatively constant speed, i.e., within a predefined range of speeds; scanning too slow or too fast will also result in a read error.

It is anticipated that new or inexperienced users of manual optical readers may encounter difficulty in scanning bar codes for one of several reasons. First, the user may intentionally begin scanning in the middle of the code because the user has no visual cue which indicates where the scan should start. This will cause a read error as previously described. Second, the user may begin scanning too close to the edge of the bar code. Obviously, if the user's aim with the reader is somewhat inaccurate, intending to begin the scan close to the edge of the code may result in actually starting the scan within the code string itself rather than to the side, thereby omitting encoded characters from the scan and causing a read error. Even if the movement of the reader encompasses all of the encoded characters, however, beginning the scan too close to the edge of the code may still result in a read error. This is because the user must accelerate the scanner from its static starting position up to the desired scanning speed. As the reader is being accelerated, its speed will initially be below the acceptable range of scanning speeds, and during this time the characters moved across by the reader will not be properly sensed. Third, the user may begin the scan too far from the code. While this may reduce read problems associated with under-speed scanning, it increases the likelihood that the user's scan path (i.e., the path followed by the target region of the reader) will drift off of the longitudinal code axis such that encoded characters (especially at the end of the code string) are missed. Facilitating the proper scanning of bar codes by users of manual optical readers is thus an important aspect of expanding the use of these systems.

Referring again to FIG. **40**, there is illustrated an aiming indicia **4050** disposed adjacent the bar code **4000**. The aiming indicia includes a graphic element **4052** disposed along the longitudinal code axis **4010** and spaced apart from the nearest of the code bars **4012** by a distance of at least ten times the minimum unit width for the code bars (i.e. the graphic element may not be placed within the quiet zones **4028** of the bar code). Preferably, the graphic element **4052** is centered along the longitudinal code axis **4010**, however, this is not strictly required. The graphic element **4052** has no encoded information which can be extracted by the optical reader, and is therefore referred to as being "non-encoded".

Users of manual optical readers will be instructed or otherwise induced to scan the bar code **4000** by first aiming the reader at the aiming indicia **4050**, preferably at the center **4056**, and then sweeping the aim point (i.e., target region) of the reader along the code axis from the aiming indicia across the entire bar code. Stated in more technical terms, the user will first hold the optical reader (e.g., reference numeral **2500**, FIGS. **25–30**) to direct its optical axis (e.g., reference numeral **2604**, FIGS. **26, 30**) such that the target region (e.g., reference numeral **2926**, FIGS. **29, 30**) is on the aiming indicia **4050**. Next, the user will move the optical reader to

direct the optical axis **2604** such that the target region **2926** sweeps along the longitudinal code axis **4010** from the aiming indicia **4050** across the entire bar code **4000**. The aiming indicia **4050** is disposed relative to the bar code **4000** such that users following the procedure described above will encounter significantly reduced reading errors. Further, the aiming indicia **4050** provides a strong visual cue which helps to remind the user of proper scanning techniques.

According to another aspect of the current invention, an enhanced bar code **4070** (FIG. **40**) is provided by combining a non-encoded aiming indicia **4050** and a bar code **4000** including the encoded character string **4002**. The enhanced bar code **4070** may further comprise non-encoded wedge symbols **4030** as previously described.

In one embodiment, the graphic element **4052** has a height **4054**, measured in a direction perpendicular to the longitudinal code axis **4010**, within the range from about 50% to about 105% of the height **4038** of the code bars **4012**. This range provides, at the lower end, an aiming indicia **4050** large enough to be readily noticed (and thus provide a visual cue), while at the higher end it provides an indicia which is not so large as to prompt users to become careless and begin their scan too high or too low with respect to the center axis. In another embodiment, the graphic element **4052** has a height **4054** within the range from about 85% to about 100% of the height **4038** of the code bars. Aiming indicia within this range maintain a generally rectangular overall appearance for the enhanced bar code **4070**. In a preferred embodiment, the aiming indicia **4050** has a graphic element **4052** with a height of about 95% of the height of the code bars.

In one embodiment of the current invention, the graphic element **4052** is separated from the nearest portion of the bar code **4000** by a distance (denoted by reference numeral **4058**), measured in a direction parallel to the longitudinal code axis **4010**, within the range from about 15% to about 30% of the height **4054** of the element. This range is believed to provide optimum longitudinal placement of the aiming indicia **4050** to ensure that the manual optical reader is fully accelerated up to scanning speed before encountering the encoded character string **4002** of the bar code **4000**. It will be appreciated that the distance **4058** is measured from the nearest portion of any part of the bar code **4000**. Thus, for bar codes including wedge symbols **4030** or other non-encoded characters, the distance between the aiming indicia **4050** and the encoded character string **4002** will be slightly increased. However, this will not adversely affect scanning procedures in any way, since the reader can be fully accelerated and at a stable scanning speed prior to encountering the encoded character string **4002**. In another embodiment, the graphic element **4052** is separated from the nearest portion of the bar code **4000** by a distance **4058** within the range of about 18% to about 24% of the height **4054** of the element. Spacings within this range are believed to provide a more consistent visual cue to the user. In a preferred embodiment, the graphic element **4052** is separated from the nearest portion of the bar code **4000** by a distance of about 20% of the height **4054** of the element.

Users may be further induced to utilize the aiming indicia **4050** during scanning of the bar code **4000** by making the graphic element **4052** more visually prominent. Thus, in another embodiment of the current invention, the graphic element **4052** is at least partially rendered in a red color, red being a color frequently associated by the public with important information. In another embodiment, the graphic element **4052** is at least partially rendered in a color which contrasts with the color of the code bars **4012** in the bar code **4000**, the public also associating contrasting colors with important information. For example, in still another embodiment, the graphic element **4052** is at least partially red in color and the code bars **4012** of the bar code are black in color. It will be appreciated, other colors or combinations of contrasting colors can be utilized for rendering the graphic element **4052** and bar code **4000** without departing from the scope of the current invention.

As illustrated in FIG. **40**, the graphic element **4052** of the aiming indicia **4050** need not be a single element but rather may include a plurality of discrete sub-elements. For example, as illustrated in FIG. **40**, a first sub-element **4060** can be a colon symbol (":") and a second sub-element **4062** can be a letter C. The graphic element **4052** so created may be a logo for a company sponsoring the bar code, on the other hand it may simply be a combination of elements believed effective in drawing the user's attention to the aiming indicia **4050**. It is, of course, possible to combine certain aspects of the invention previously described. For example, the graphic sub-elements **4060** and **4062** may be rendered in an attention-attracting color or with contrasting colors. In one example, the colon **4060** and letter C **4062** may be rendered with their interior areas (denoted by reference numeral **4064**) colored red. In another embodiment, both the colon sub-element **4060** and the C sub-element **4062** may have the interior area **4064** colored red and an outline or border area (denoted by reference numeral **4066**) colored black.

Referring now to FIGS. **41** and **42**, there are illustrated flowcharts of a method for facilitating the reading of a bar code with a manual optical reader. The flowchart of FIG. **41** illustrates the process from the perspective of the bar code sponsor (i.e., the entity responsible for producing the bar code and/or marking it on a product or other article of commerce) and FIG. **42** illustrates the process from the perspective of the user (i.e., the entity actually scanning the bar code with a manual optical reader).

Referring first to FIG. **41**, the process from the sponsor's perspective begins in the block designated with reference numeral **4102**. Flow then proceeds to function block **4104**, wherein an aiming indicia is provided along the longitudinal code axis adjacent a bar code, spaced apart from the nearest code bars by a distance of at least ten times a minimum width for the code bars. This step results in the formation of an enhanced bar code **4070** as illustrated in FIG. **40**, including a bar code **4000** with encoded character string **4002** and (optionally) wedge symbols **4030**, combined with an aiming indicia **4050**. Flow proceeds from function block **4104** to function block **4106**, wherein users of manual optical readers are induced to read the bar code **4000** using the aiming indicia **4050** in accordance with the following procedures: First, aiming the optical reader at the aiming indicia **4050**, and second, sweeping the aim point of the reader along the longitudinal code axis **4010** from the aiming indicia completely across the bar code **4000**.

In one embodiment of the process, the sponsor may induce users to read the bar code using the aiming indicia **4050** by means of instructions included with the optical reader. In an alternative embodiment, the sponsor may induce users through instructions included with and/or printed on products bearing the enhanced bar code **4070**. In yet another embodiment, the sponsor may induce users through instructions provided in advertisements or public service announcements, or through other known educational or instructional means.

Referring now to FIG. **42**, the process according to the user's perspective begins in block **4202** and proceeds to a

first function block **4204**, wherein the user aims the optical reader at the aiming indicia **4050**. Preferably, the optical reader will be aimed at the center **4056** of the graphic element **4052**, however precise aiming will typically not be required. Described in more technical terms, the function of block **4204** requires the user to direct the optical axis of the optical reader such that the target region of the reader is within, and preferably centered on, the aiming indicia. Flow then proceeds to function block **4206**, wherein the user sweeps the aim point of the reader along the code axis **4010** from the aiming indicia **4050** across the bar code **4000**. Stated in more technical terms, the function block **4206** requires the user to direct the optical axis of the optical reader such that the target region of the reader sweeps along the longitudinal code axis **4010** from the aiming indicia **4050** through the bar code **4000**. The process disclosed proves the user with a prominent visual clue which indicates where the scan movement should begin. Further, while the user must still maintain a reasonably constant speed while scanning across the encoded portions of the bar code, starting the scan movement at the aiming indicia will allow the optical reader to be fully accelerated by the time it reaches the encoded character string **4002**. This will greatly improve the reliability of the scanning process.

As previously described, some systems and/or processes may require an optical reader which is capable of scanning, recognizing and decoding indicia (e.g., bar codes) which have been encoded in accordance with any one of a number of different encoding types (i.e., encoding standards). For example, TABLE 2 (appended hereto following the Detailed Description) lists over thirty different bar code encoding types which are in widespread use. Further, new bar code encoding types are constantly being introduced, such as the unique bar code previously described herein and illustrated in FIG. **40**. Assuming that the symbology and rules for the encoding types of interest are known, the technologies necessary to allow a single optical reader to scan, recognize and decode bar codes encoded in accordance with more than one encoding type are known in the art and will not be described in detail. However, the mere fact that an optical reader may be able to recognize and decode an indicia it has scanned does not ensure that the data transmitted from the reader will be adequate for the further processing contemplated by a particular process. Therefore, new systems and methods for transmitting data from an optical reader following scanning of an encoded indica are required.

Referring now to FIG. **43**, there is illustrated a diagrammatic view of one embodiment of a system for transmitting data from an optical reader following scanning by the reader of an indicia encoding information in accordance with one of a plurality of information encoding types. The system **4300** of this embodiment is incorporated into the structure and circuitry of an optical reader **4302** which may be an optical reader such as those previously described herein and illustrated in FIGS. **25–35**. The optical reader **4302** includes an optical system **4304** which detects the light rays **4306** reflected from the target indicia **4308** during the scanning process and produces an electronic signal **4310** representative thereof. The electronic signals **4310** representing the scanned indicia are provided by the optical system **4304** to the system **4300** so that they may be transmitted from the optical reader for further processing. The system **4300** includes an electronic processor **4312** disposed within the optical reader **4302** and adapted for analyzing the electronic signal **4310** to determine which of a plurality of encoding types was used for encoding the scanned indicia **4308**. As previously noted, the circuitry required for making the determination of encoding type is known in the art and will not be described in detail. The processor **4312** is operatively connected to electronic transmitting circuitry **4314** disposed within the optical reader **4302** and adapted for transmitted a message packet **4316** which is indicative of the particular one of the plurality of encoding types that was used for encoding the scanned indicia **4308**.

In one embodiment, the message packet **4316** transmitted by system **4300** does not contain any of the information which was actually encoded in the indicia **4308**. Rather, the message packet **4316** is merely indicative of the particular encoding type of the scanned indicia **4308**. For example, assume that an optical reader incorporating this embodiment is used to scan two barcodes, the first barcode having an encoding type (i.e. format) of Code 128 and encoding the information "ABDCE", and the second barcode having an encoding type UPCA and encoding the information "1120156789". The system of this embodiment would send a first message packet **4316** indicative that the first barcode had encoding type Code 128 and a second message package indicative that the second barcode had encoding type UPCA. Data regarding the encoded information content of the scanned barcodes would not be included in the message packets.

The message packet **4316** may indicate the particular encoding type used on the scanned indicia **4308** in a variety of ways. For example, the message packet **4316** may include an encoding type identification ("TID") code corresponding to the particular one of the plurality of encoding types which was used for the scanned indicia **4308**. In a preferred embodiment, the TID is a fixed length character string which simplifies its incorporation into a standard message packet. Referring again to TABLE 2, there is provided a list of TIDs, each one corresponding to a particular barcode encoding type, e.g., TID "128" corresponds to encoding type "Code 128", TID "E28" corresponds to encoding type "EAN 128", etc. It will be appreciated that while the TIDs shown in TABLE 2 each consist of a three character string, TIDs having other fixed lengths, or having variable lengths could be used within the scope of the current invention.

Referring still to FIG. **43**, in another embodiment, the system **4300** further comprises electronic circuitry disposed within the optical reader **4302** for accessing a lookup table **4318** (or alternatively, a computer database (not shown)) including a plurality of encoding types and a plurality of TIDs in associating each of the plurality of encoding types with one of the plurality of TIDs, and for retrieving therefrom the TID corresponding to the particular one of the plurality of encoding types that was used for encoding the scanned indicia **4308**. It will appreciated that the electronic circuitry for accessing and retrieving encoding type information as previously described may be circuitry incorporated into the processor **4312** or it may be separate circuitry which is operatively connected to the processor. In one embodiment, the system **4300** will include a read only memory (ROM) or a random access memory (RAM) disposed within the optical reader **4302** and within which the lookup table **4318** is stored. In another embodiment, the system **4300** will include a separate electronic device (not shown) which is operably connected to the optical reader **4302** and within which the lookup table **4318** resides. For example, the separate device on which the lookup table **4318** resides may be a personal computer (PC) connected to the optical reader **4302**, or alternatively, the separate device may be a remote computer (not shown) which is operably connected to the optical reader by a network. In any of the embodiments wherein the system **4300** incorporates a sepa-

rate device in addition to the optical reader **4302**, the lookup table (or database if applicable) may reside in a software application running on the separate device.

Other embodiments of the invention may perform further processing or incorporate additional information into the message packet **4316** before transmitting data from the optical reader **4302**. In one such embodiment, the system **4300** includes electronic circuitry disposed within the optical reader **4302** and adapted for decoding the information encoded in the indicia **4308**. This circuitry may be incorporated into or constitute a portion of the processor **4312** or it may be additional circuitry within the optical reader. In another embodiment, the system **4300** further comprises electronic circuitry **4324** disposed within the optical reader **4302** and adapted for assembling at least a portion of the information previously encoded in the indicia **4308** into the message packet **4316**. For example, assume that the indicia **4308** illustrated in FIG. **43** encodes the information "45678" in accordance with the Code 128 encoding type. The circuitry of processor **4312** would receive the electronic signal **4310** representative of the scanned barcode, determine the encoding type is "Code 128", access the lookup table **4318** or database and retrieve the TID "128" corresponding to encoding type "Code 128" and then further process the signal to decode the information encoded in the indicia, i.e., "45678". The processor **4312** would then transfer at least a portion of the decoded information in a data packet **4326** to the message assembly circuitry **4324**. In addition, in some embodiments, the processor **4312** will also transmit a data packet **4328** containing the TID of the scanned indicia to the message assembly circuitry **4324**. The message assembly circuitry **4324** will then assembly the message packets **4326** and **4328** and forward them to transmitting circuitry **4314** for transmission to an external device **4330** in message packet **4316**.

In another embodiment, the system **4300** further comprises electronic circuitry **4332** disposed within the optical reader **4302** and storing a unique serial number **4334** which identifies the optical reader **4302**. The system **4300** of this embodiment further comprises electronic circuitry disposed within the optical reader **4302** for retrieving the serial number **4334** from the storage circuitry **4332**, and further electronic circuitry disposed within the optical reader for assembling at least a portion of the serial number **4334** into the message packet **4316**. The electronic circuitry for retrieving the serial number **4334** may constitute a portion of the processor **4312** or it may be other electronic circuitry operably connected to the processor **4312**. The circuitry for assembling the serial number **4334** (or a portion thereof) into the message packet may be the message assembly circuitry **4324** previously described or it may be other electronic circuitry operably connected to the transmitting circuitry **4314**. In the case where processor **4312** and message assembly circuitry **4324** are used, the processor, after retrieving the serial number from the storage circuitry **4332**, will transmit a data packet **4336** containing the serial number to the message assembly circuitry **4324**. As previously described, the message assembly circuitry will assemble the various data packets and forward them to the transmitting circuitry **4314** to be transmitted in the final message packet **4316**.

In another embodiment, the system **4300** further includes electronic circuitry **4338** disposed within the optical reader **4302** for encrypting the message packet prior to transmitting it from the optical reader. After the message has been encrypted, it will be forwarded to the transmitting circuitry **4314** for transmission from the optical reader.

Referring now to FIG. **44**, there is illustrated a sample data packet **4340** from the message assembly circuitry **4324** in accordance with one embodiment. The data packet **4340** includes three data segments **4402**, **4404** and **4406** which contain, respectively, at least a portion of the serial number **4334** identifying the optical reader **4302** (in this case "123"), the TID corresponding to the encoding type of the scanned indicia **4308** (in this case "128"), and at least a portion of the information which was encoded in the scanned indicia (in this case "45678"). It will be apparent that the order of the segments is immaterial provided it follows the standards set down for the circuitry of a particular embodiment.

Referring now to FIG. **45**, there is illustrated a sample data packet from the encryption circuitry **4338** in accordance with another embodiment. The encrypted sample data packet **4342** includes three data segments **4502**, **4504** and **4506** which correspond, respectively, to the segments **4402**, **4404** and **4406** in the data packet **4340** assembled by the message assembly circuitry **4324**. In the case of data packet **4342**, however, each of the data segments has passed through encryption circuitry which as altered the original character values according to the encryption scheme. Thus, the serial number of the optical reader **4302** is encrypted from "123" to "XXX", the TID "128" is encrypted into "YYY" and so on. It will be apparent that the sample encrypted values "XXX" and "YYY" are used for illustration only and that the actual encrypted values would depend upon the encryption scheme actually implemented in circuitry **4338**.

Referring now to FIG. **46**, there is illustrated a sample final message packet from the transmitting circuitry **4314** of this embodiment. The final message packet **4316** includes five data segments: **4602**, **4604**, **4606**, **4608** and **4610**. The middle segments **4604**, **4606** and **4608** correspond directly to the data segments **4502**, **4504** and **4506**, respectively, forwarded from the encryption circuitry **4338**. The transmitting circuitry **4314** takes the encrypted message packet **4342** and adds a header segment **4602** (in this case the control characters "ALT+F10" to the front of the data segment and a trailer segment **4610** (in this case the control character [ENTER]) at the end of the data segment. It will be apparent that other header segments, trailer segments or additional information can be appended in the final message **4316** provided these are consistent with the standards expected for the optical reader circuitry.

After the final message packet **4316** has been assembled and encrypted (if desired) the transmitting circuitry **4314** transmits the message packet from the optical reader. In a preferred embodiment, the transmitting circuitry **4314** outputs the keystroke equivalents of the characters in the message packet **4316** into the keyboard port of a computer (not shown). While this is a preferred embodiment, it will be apparent that the optical reader could also output the data in accordance with any other computer data transfer protocol or standard including those standards previously described herein. In some embodiments, the transmitting circuitry **4314** is adapted for transmitting the message packet **4316** over a hardwired connection between the optical reader and the computer or external device **4330**. In other embodiments, the electronic transmitting circuitry **4314** is adapted for transmitting the message packet **4316** over a wireless connection between the optical reader **4302** and the external device **4330**. Such wireless connections may include infrared (IR), radio frequencies (RF) and audio tones, whether within human hearing range or in the ultrasonic range.

Referring now to FIG. **47**, there is illustrated a flowchart for one embodiment of a process for transmitting data from an optical reader in accordance with another aspect of the

current invention. Because this embodiment provides a method of transmitting data from an optical reader following scanning by the optical reader of an indicia encoding information in accordance with one of a plurality of information encoding types, the flowchart begins with block **4702**, wherein the encoded indicia is scanned. It will be appreciated that the scanning of the encoded indicia does not actually constitute a step in the method of this embodiment but rather is performed before the steps of the current method. Thus, block **4702** is shown in dashed line to indicate it is a precursor step. The process of this embodiment actually begins in block **4704** wherein it is determined that a particular one of a plurality of encoding types was used for encoding the scanned indicia. As previously described, this determination can be performed by electronic scanners and processors using known technology. The process continues as indicated by arrow **4705** to block **4706**, an optional step wherein additional processing is performed as will be described in additional detail below. After completing the additional processing of block **4706** (if applicable) the process continues as indicated by arrow **4707** to function block **4708** wherein a message packet is prepared which is indicative of the encoding type use for encoding the scanned indicia. The preparation of the message packet may be performed by a system as previously disclosed herein. After the message packet indicative of the encoding type has been prepared, the process continues as indicated by arrow **4709** to function block **4710**, wherein the message packet indicative of the particular one of the plurality of encoding types that was used for encoding the scanned indicia is transmitted from the optical reader. This represents the end of the general process as denoted by the END block **4712**.

Referring now to FIG. **48**, there is illustrated a flowchart of the optional sub-steps which may be performed as part of the step in block **4706** for performing additional processing. The flowchart connector labeled "A" and denoted by reference numeral **4802** corresponds to the flow shown by arrow **4705** which begins the optional sub-steps. The process continues into function block **4804** wherein information encoded in the scanned indicia is decoded. This step of decoding the information is distinguished from the primary step **4704** in which it was determined the encoding type (i.e. TID) that was used for encoding the scanned indicia. Flow then proceeds to function block **4806** wherein the serial number identifying the optical reader is retrieved. Flow then proceeds to function block **4808** wherein a stored table of encoding types and corresponding encoding type identification codes (TIDs) is accessed, and the subsequent block **4810** in which the encoding type identification code (TID) corresponding to the encoding type used for the scanned indicia is retrieved. It will apparent that only sub-steps **4808** and **4810** need be performed together and in order (if performed at all) and that the remaining sub-steps, i.e. **4804** and **4806** may be performed in different orders or left out altogether in certain embodiments. Once any additional processing desired has been completed, however, the process continues to flowchart connector B (denoted by reference number **4812**) which rejoins the general method at the arrow indicated of **4707**.

Referring now to FIG. **49**, there is illustrated a flow chart for the sub-steps of assembling a message packet represented by function box **4708**. The sub-steps begin with block **4904** which can be seen as constituting the receipt point for the process flow indicated by arrow **4707** of the main process. The flow then continues to block **4906** wherein a TID corresponding to the encoding type of the scanned indicia is assembled into the message packet. The flow continues to block **4908** wherein at least a portion of the information decoded from the scanned indicia is assembled into the message packet. The process continues to function block **4910** wherein at least a portion of a serial number identifying the optical reader is assembled into the message packet. The process then continues to function block **4912** wherein the message packet, or portions thereof, are encrypted. This represents the end of sub-steps as indicated by END block **4914**, at which point the sub-steps rejoin the main process of FIG. **47** at the point indicated by arrow **4709**. It will be apparent that all of these sub-steps will be present only in certain embodiments and that some of these sub-steps will require precursor steps as previously described.

In a preferred embodiment, the step of transmitting the message packet from the optical reader includes the outputting the keystroke equivalents of the characters in the message packet into the keyboard port of a computer. As previously described, this outputting may be performed over a hardwired connection between the optical reader and the computer or over a wireless connection between the optical reader and the computer in accordance with known wireless communication techniques.

Although the preferred embodiment has been described in detail, it should be understood that various changes, substitutions and alterations can be made therein without departing from the spirit and scope of the invention as defined by the appended claims.

(TABLES 1 and 2 begin on the following page)

TABLE I

| Value | Code Set A | Code Set B | Code Set C | Bar/Space Pattern B S B S B S |
|---|---|---|---|---|
| 0 | SP | SP | 00 | 2 1 2 2 2 2 |
| 1 | ! | ! | 01 | 2 2 2 1 2 2 |
| 2 | " | " | 02 | 2 2 2 2 2 1 |
| 3 | # | # | 03 | 1 2 1 2 2 3 |
| 4 | $ | $ | 04 | 1 2 1 3 2 2 |
| 5 | % | % | 05 | 1 3 1 2 2 2 |
| 6 | & | & | 06 | 1 2 2 2 1 3 |
| 7 | ' | ' | 07 | 1 2 2 3 1 2 |
| 8 | ( | ( | 08 | 1 3 2 2 1 2 |
| 9 | ) | ) | 09 | 2 2 1 2 1 3 |
| 10 | * | * | 10 | 2 2 1 3 1 2 |
| 11 | + | + | 11 | 2 3 1 2 1 2 |
| 12 | , | , | 12 | 1 1 2 2 3 2 |
| 13 | - | - | 13 | 1 2 2 1 3 2 |
| 14 | . | . | 14 | 1 2 2 2 3 1 |
| 15 | / | / | 15 | 1 1 3 2 2 2 |
| 16 | 0 | 0 | 16 | 1 2 3 1 2 2 |
| 17 | 1 | 1 | 17 | 1 2 3 2 2 1 |
| 18 | 2 | 2 | 18 | 2 2 3 2 1 1 |
| 19 | 3 | 3 | 19 | 2 2 1 1 3 2 |
| 20 | 4 | 4 | 20 | 2 2 1 2 3 1 |
| 21 | 5 | 5 | 21 | 2 1 3 2 1 2 |
| 22 | 6 | 6 | 22 | 2 2 3 1 1 2 |
| 23 | 7 | 7 | 23 | 3 1 2 1 3 1 |
| 24 | 8 | 8 | 24 | 3 1 1 2 2 2 |
| 25 | 9 | 9 | 25 | 3 2 1 1 2 2 |
| 26 | : | : | 26 | 3 2 1 2 2 1 |
| 27 | ; | ; | 27 | 3 1 2 2 1 2 |
| 28 | < | < | 28 | 3 2 2 1 1 2 |
| 29 | = | = | 29 | 3 2 2 2 1 1 |
| 30 | > | > | 30 | 2 1 2 1 2 3 |
| 31 | ? | ? | 31 | 2 1 2 3 2 1 |
| 32 | @ | @ | 32 | 2 3 2 1 2 1 |
| 33 | A | A | 33 | 1 1 1 3 2 3 |
| 34 | B | B | 34 | 1 3 1 1 2 3 |
| 35 | C | C | 35 | 1 3 1 3 2 1 |
| 36 | D | D | 36 | 1 1 2 3 1 3 |
| 37 | E | E | 37 | 1 3 2 1 1 3 |

TABLE I-continued

| Value | Code Set A | Code Set B | Code Set C | Bar/Space Pattern B S B S B S |
|---|---|---|---|---|
| 38 | F | F | 38 | 1 3 2 3 1 1 |
| 39 | G | G | 39 | 2 1 1 3 1 3 |
| 40 | H | H | 40 | 2 3 1 1 1 3 |
| 41 | I | I | 41 | 2 3 1 3 1 1 |
| 42 | J | J | 42 | 1 1 2 1 3 3 |
| 43 | K | K | 43 | 1 1 2 3 3 1 |
| 44 | L | L | 44 | 1 3 2 1 3 1 |
| 45 | M | M | 45 | 1 1 3 1 2 3 |
| 46 | N | N | 46 | 1 1 3 3 2 1 |
| 47 | O | O | 47 | 1 3 3 1 2 1 |
| 48 | P | P | 48 | 3 1 3 1 2 1 |
| 49 | Q | Q | 49 | 2 1 1 3 3 1 |
| 50 | R | R | 50 | 2 3 1 1 3 1 |
| 51 | S | S | 51 | 2 1 3 1 1 3 |
| 52 | T | T | 52 | 2 1 3 3 1 1 |
| 53 | U | U | 53 | 2 1 3 1 3 1 |
| 54 | V | V | 54 | 3 1 1 1 2 3 |
| 55 | W | W | 55 | 3 1 1 3 2 1 |
| 56 | X | X | 56 | 3 3 1 1 2 1 |
| 57 | Y | Y | 57 | 3 1 2 1 1 3 |
| 58 | Z | Z | 58 | 3 1 2 3 1 1 |
| 59 | [ | [ | 59 | 3 3 2 1 1 1 |
| 60 | \ | \ | 60 | 3 1 4 1 1 1 |
| 61 | ] | ] | 61 | 2 2 1 4 1 1 |
| 62 | | | 62 | 4 3 1 1 1 1 |
| 63 | _ | _ | 63 | 1 1 1 2 2 4 |
| 64 | NUL | ' | 64 | 1 1 1 4 2 2 |
| 65 | SOH | a | 65 | 1 2 1 1 2 4 |
| 66 | STX | b | 66 | 1 2 1 4 2 1 |
| 67 | ETX | c | 67 | 1 4 1 1 2 2 |
| 68 | EOT | d | 68 | 1 4 1 2 2 1 |
| 69 | ENQ | e | 69 | 1 1 2 2 1 4 |
| 70 | ACK | f | 70 | 1 1 2 4 1 2 |
| 71 | BEL | g | 71 | 1 2 2 1 1 4 |
| 72 | BS | h | 72 | 1 2 2 4 1 1 |
| 73 | HT | i | 73 | 1 4 2 1 1 2 |
| 74 | LF | j | 74 | 1 4 2 2 1 1 |
| 75 | VT | k | 75 | 2 4 1 2 1 1 |
| 76 | FF | I | 76 | 2 2 1 1 1 4 |
| 77 | CR | m | 77 | 4 1 3 1 1 1 |
| 78 | SO | n | 78 | 2 4 1 1 1 2 |
| 79 | SI | o | 79 | 1 3 4 1 1 1 |
| 80 | DLE | p | 80 | 1 1 1 2 4 2 |
| 81 | DC1 | q | 81 | 1 2 1 1 4 2 |
| 82 | DC2 | r | 82 | 1 2 1 2 4 1 |
| 83 | DC3 | s | 83 | 1 1 4 2 1 2 |
| 84 | DC4 | t | 84 | 1 2 4 1 1 2 |
| 85 | NAK | u | 85 | 1 2 4 2 1 1 |
| 86 | SYN | v | 86 | 4 1 1 2 1 2 |
| 87 | ETB | w | 87 | 4 2 1 1 1 2 |
| 88 | CAN | x | 88 | 4 2 1 2 1 1 |
| 89 | EM | y | 89 | 2 1 2 1 4 1 |
| 90 | SUB | z | 90 | 2 1 4 1 2 1 |
| 91 | ESC | { | 91 | 4 1 2 1 2 1 |
| 92 | FS | \| | 92 | 1 1 1 1 4 3 |
| 93 | GS | } | 93 | 1 1 1 3 4 1 |
| 94 | RS | ~ | 94 | 1 3 1 1 4 1 |
| 95 | US | DEL | 95 | 1 1 4 1 1 3 |
| 96 | FNC 3 | FNC 3 | 96 | 1 1 4 3 1 1 |
| 97 | FNC 2 | FNC 2 | 97 | 4 1 1 1 1 3 |
| 98 | SHIFT | SHIFT | 98 | 4 1 1 3 1 1 |
| 99 | CODE C | CODE C | 99 | 1 1 3 1 4 1 |
| 100 | CODE B | FNC 4 | CODE B | 1 1 4 1 3 1 |
| 101 | FNC 4 | CODE A | CODE A | 3 1 1 1 4 1 |
| 102 | FNC 1 | FNC 1 | FNC 1 | 4 1 1 1 3 1 |
| 103 | Start A | Start A | Start A | 2 1 1 4 1 2 |
| 104 | Start B | Start B | Start B | 2 1 1 2 1 4 |
| 105 | Start C | Start C | Start C | 2 1 1 2 3 2 |
| 106 | Stop | Stop | Stop | 2 3 3 1 1 2 |

TABLE 2

| TID | ENCODING TYPE |
|---|---|
| 128 | Code 128 |
| E28 | EAN 128 |
| CBR | Codabar |
| E13 | EAN 13 |
| E32 | EAN 13+2 |
| E35 | EAN 13+5 |
| E08 | EAN 8 |
| E82 | EAN 8+2 |
| E85 | EAN 8+5 |
| IBN | ISBN |
| IB2 | ISBN+2 |
| IB5 | ISBN+5 |
| ISN | ISSN |
| IS2 | ISSN+2 |
| IS5 | ISSN+5 |
| ITF | ITF |
| J13 | JAN-13 |
| J32 | JAN-13+2 |
| J35 | JAN-13+5 |
| J08 | JAN-8 |
| J82 | JAN-8+2 |
| J85 | JAN-8+5 |
| PCD | Pharmacode |
| UPA | UPCA |
| UA2 | UPCA+2 |
| UA5 | UPCA+5 |
| UPE | UPCE |
| UE2 | UPCE+2 |
| UE5 | UPCE+5 |
| PLS | Plessy |
| C39 | Code 39 |

What is claimed is:

**1**. A method for transmitting data from an optical reader following scanning by the optical reader of an indica encoding information in accordance with one of a plurality of information encoding types, the method comprising the steps of:

determining that a particular one of the plurality of encoding types was used for encoding the scanned indicia; and

transmitting a message packet from the optical reader which is indicative of the particular one of the plurality of encoding types that was used for encoding the scanned indicia.

**2**. A method in accordance with claim **1**, wherein the message packet includes an encoding type identification code corresponding to the particular one of the plurality of encoding types that was used for encoding the scanned indicia.

**3**. A method in accordance with claim **2**, further comprising the steps of:

accessing a lookup table including the plurality of encoding types and a plurality of encoding type identifications and associating each of the plurality of encoding types with one of the plurality of encoding type identifications; and

retrieving from the lookup table the encoding type identification corresponding to the particular one of the plurality of encoding types that was used for encoding the scanned indicia.

**4**. A method in accordance with claim **3**, wherein the lookup table is stored in read-only memory (ROM) within the optical reader.

**5**. A method in accordance with claim **3**, wherein the lookup table is stored in random-access memory (RAM) within the optical reader.

**6**. A method in accordance with claim **3**, wherein the lookup table resides on a separate device operably connected to the optical reader.

7. A method in accordance with claim 6, wherein the separate device is a personal computer (PC).

8. A method in accordance with claim 6, wherein the separate device is a remote computer operably connected to the optical reader by a network.

9. A method in accordance with claim 6, wherein the lookup table resides in a software application running on the separate device.

10. A method in accordance with claim 2, further comprising the steps of:

accessing a database including the plurality of encoding types and a plurality of encoding type identifications and associating each of the plurality of encoding types with one of the plurality of encoding type identifications; and

retrieving from the database the encoding type identification corresponding to the particular one of the plurality of encoding types that was used for encoding the scanned indicia.

11. A method in accordance with claim 10, wherein the database resides within the optical reader.

12. A method in accordance with claim 10, wherein the database resides on a separate device operably connected to the optical reader.

13. A method in accordance with claim 12, wherein the separate device is a personal computer (PC).

14. A method in accordance with claim 12, wherein the separate device is a remote computer operably connected to the optical reader by a network.

15. A method in accordance with claim 12, wherein the database resides in a software application running on the separate device.

16. A method in accordance with claim 2, wherein the encoding type identification code is a three character string.

17. A method in accordance with claim 1, further comprising the steps of:

decoding the information encoded in the indicia; and

assembling at least a portion of the information previously encoded in the indicia into the message packet.

18. A method in accordance with claim 1, further comprising the steps of:

determining a unique serial number identifying the optical reader; and

assembling at least a portion of the serial number into the message packet.

19. A method in accordance with claim 1, further comprising the step of encrypting the message packet prior to transmitting it from the optical reader.

20. A method in accordance with claim 1, wherein the step of transmitting includes outputting the keystroke equivalents of the characters in the message packet into the keyboard port of a computer.

21. A method in accordance with claim 20, wherein the outputting of the keystroke equivalents is performed over a hard-wired connection between the optical reader and the computer.

22. A method in accordance with claim 20, wherein the outputting of the keystroke equivalents is performed over a wireless connection between the optical reader and the computer.

23. A method for transmitting data from an optical reader following scanning by the optical reader of an indica encoding information in accordance with one of a plurality of information encoding types, the method comprising the steps of:

determining that a particular one of the plurality of encoding types was used for encoding the scanned indicia;

accessing an electronic data storage means including the plurality of encoding types and a plurality of encoding type identifications and associating each of the plurality of encoding types with one of the plurality of encoding type identifications;

retrieving from the electronic data storage means the encoding type identification corresponding to the particular one of the plurality of encoding types that was used for encoding the scanned indicia;

decoding the information encoded in the indicia;

determining a unique serial number identifying the optical reader;

assembling the encoding type identification corresponding to the particular one of the plurality of encoding types that was used for encoding the scanned indicia, at least a portion of the information previously encoded in the indicia, and at least a portion of the serial number into a message packet; and

transmitting the message packet from the optical reader.

24. A method in accordance with claim 23, wherein the electronic data storage means is a computer lookup table.

25. A method in accordance with claim 23, wherein the electronic data storage means is a computer database.

26. A system for transmitting data from an optical reader following scanning by the optical reader of an indica encoding information in accordance with one of a plurality of information encoding types, the system comprising:

an electronic processor disposed within the optical reader and adapted for determining that a particular one of the plurality of encoding types was used for encoding the scanned indicia; and

electronic circuitry disposed within the optical reader for transmitting a message packet which is indicative of the particular one of the plurality of encoding types that was used for encoding the scanned indicia.

27. A system in accordance with claim 26, wherein the message packet includes an encoding type identification code corresponding to the particular one of the plurality of encoding types that was used for encoding the scanned indicia.

28. A system in accordance with claim 27, further comprising electronic circuitry disposed within the optical reader for accessing a lookup table including the plurality of encoding types and a plurality of encoding type identifications and associating each of the plurality of encoding types with one of the plurality of encoding type identifications and for retrieving therefrom the encoding type identification corresponding to the particular one of the plurality of encoding types that was used for encoding the scanned indicia.

29. A system in accordance with claim 28, further comprising a read-only memory (ROM) disposed within the optical reader within which the lookup table is stored.

30. A system in accordance with claim 28, further comprising a random-access memory (RAM) disposed within the optical reader within which the lookup table is stored.

31. A system in accordance with claim 28, further comprising a separate electronic device operably connected to the optical reader within which the lookup table resides.

32. A system in accordance with claim 27, further comprising electronic circuitry disposed within the optical reader for accessing a computer database including the plurality of encoding types and a plurality of encoding type identifications and associating each of the plurality of encoding types with one of the plurality of encoding type identifications and for retrieving therefrom the encoding type identification

corresponding to the particular one of the plurality of encoding types that was used for encoding the scanned indicia.

**33**. A system in accordance with claim **26**, further comprising:

electronic circuitry disposed within the optical reader and adapted for decoding the information encoded in the indicia; and

electronic circuitry disposed within the optical reader and adapted for assembling at least a portion of the information previously encoded in the indicia into the message packet.

**34**. A system in accordance with claim **26**, further comprising:

electronic circuitry disposed within the optical reader and storing a unique serial number identifying the optical reader;

electronic circuitry disposed within the optical reader for retrieving the serial number; and

electronic circuitry disposed within the optical reader for assembling at least a portion of the serial number into the message packet.

**35**. A system in accordance with claim **26**, further comprising electronic circuitry disposed within the optical reader for encrypting the message packet prior to transmitting it from the optical reader.

**36**. A system in accordance with claim **26**, wherein the electronic circuitry for transmitting the message packet outputs the keystroke equivalents of the characters in the message packet into the keyboard port of a computer.

**37**. A system in accordance with claim **36**, wherein the electronic circuitry for transmitting the message packet is adapted for transmitting over a hard-wired connection between the optical reader and the computer.

**38**. A system in accordance with claim **36**, wherein the electronic circuitry for transmitting the message packet is adapted for transmitting over a wireless connection between the optical reader and the computer.

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